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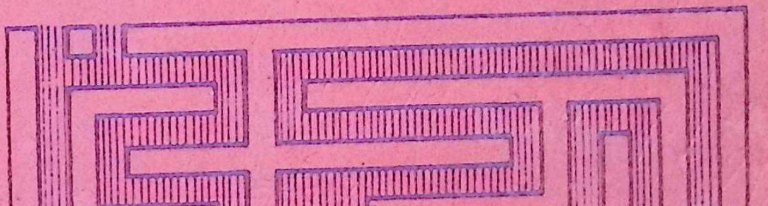

Sudarshan Raj Tiwari

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TIERED TEMPLES OF NEPAL

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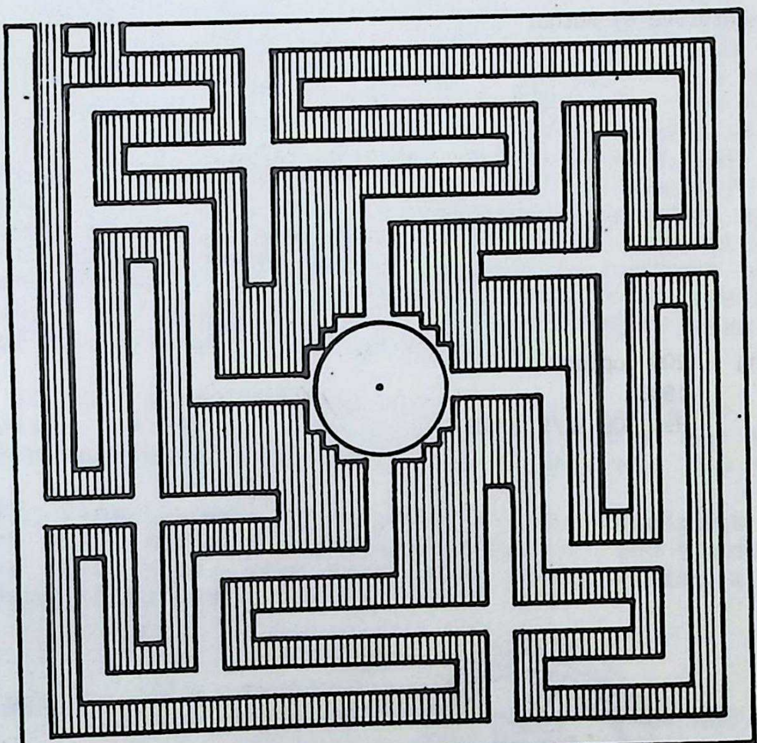

Sudarshan Raj Tiwari

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FOREWORD

Sri Sudarshan Raj Tiwari's short book on **The Tiered Temples of Nepal** breaks a fresh ground in presenting the historical architecture of the Nepal Valley, in particular its tiered temples, from the angle of complex geometrical measurements of squares and triangles. Since Sri Tiwari is a practising architect, such a method of study may be said to suit him highly. The way he has sought to interpret and conceptualise his data within the framework of Hindu Science and philoshopy of building, however, takes him far beyond the scope of his calling and brings him close to the ambit of a cultural-historian. The utilization and lay-out of space in the Malla towns in terms of residential areas, streets, temples and squares in which the rhythm of life of those times were sustained, in his opinion, are reducible to the shapes and designs of the mandala drawings which are nothing but a diagrammatic representation of the cosmos in the Hindu conception. The two short sections on the Pashupati Ksetra and the historical water-fountains (the ancient water-spouts of stone with a perennial flow in them, called Hiti in Newari) relate to the problems of environmental degradation in the most religiously cherished temple of Nepal and in general, the attitude of neglect among the modern inheritors towards this opulent heritage in utter contrast to what our ancients had done to maintain these places and what the Sastric injunctions had always been to the proper care of the sacred places of the Hindus.

Thus it is a stimulating book to read not only for its novel conception, although only in a seminal form, but also for serving a timely warning not to let things degenerate too far.

If Sri Tiwari does more credit to the treatment of historical sources and classical textual studies on the Hindu architectural science from their original, his book carries a greater promise and scope in future.

22-7-1988. **PRAYAG RAJ SHARMA**

PREFACE

Analytical study on the temple and urban spaces of Kathmandu Valley has been a rarity. I have ventured to analyse the tiered temples in terms of their religious principles, regional relation and other physical aspects. Available texts on the religious principles of proportioning has been extended to theorize on the possible plan and elevational proportioning theory. The special nature of the tiered temples and specific studies of some temples has led me to theorize on the proportioning of elevation through the use of triangles. Some of these suggestions go beyond extant old texts.

This book is a collection of articles and is divided in two parts: the first part deals with the temples and the second part dwells on the temple environs of Kathmandu Valley Towns.

Some of the articles of this book have appeared before the reader in local papers and journals earlier. "Tiered Temple or a Pagoda?" appeared first in The Rising Nepal (October 1973) with the title "Is Our Temple a Pagoda ?", "Vedic Traditions and the Tiered Temples of Nepal" in Nepal Vision (November 1987), "The Tiered Temples - a Cosmological Overview" in Tribhuvan University Journal (July 1980), "Water in Lichchhavi Period Nepal" in Water Nepal Journal (February 1988) and " Pashupati Ksetra and the Environment" in Proceedings of Semimar on Environmental Issues of Pashupati Area (November 1987). Minor modifications have been made in some of these in the light of current thoughts. The remaining chapters are appearing for the first time here.

Readers comment in welcomed particularly as the ideas and conclusions need wider testing.

Sudarshan Raj Tiwari
30 July 1988.

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Sudarshan Raj Tiwari
25 July 1992.

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TIERED TEMPLE OR A PAGODA?

Pagoda style of architecture of Japan or for that matter even of China shows a distinct visual resemblance with the Nepalese temples. This resemblance is so apparant that even our temples are wrongly said to be in the Pagoda style. Pagoda as a word does not mean much more than a pyramid. Pagoda style of architecture is and should mean buildings made like pyramids or repeated use of the same in a vertical layout. "Pagoda style" was brought into English architectural vocabulary as a reference to the Japanese style because each pyramid like roof base was more or less equal and so a visual feel of equal sized pyramids one on top of the other was felt. However the case of a Nepalese temple is surely different firstly because the reduction in the sizes of these pyramids is far from subtle and secondly because a distinct underlying difference in architectural philosophy is observed.

Pagoda, in certain contexts, can mean a tower. As soon as a need of a high monument was felt, tower was the most ideal form. In old days to construct a tower was beyond their technical and material knowhow and pyramids came into being. The pyramid of Cheops,a tomb of the Pharoah in Egypt, is believed by architecture historians to have been built using ramps to roll stones upto their positions. It can well be imagined how difficult it would have been to build a tower.

The basic need of a Nepalese builder was, however, neither size nor height. Let us take the case of size first. The roof base of the largest of our large temple is less than 50 feet, the base of the first tier of Nyatapola being about 49 feet 6 inches. It needs only an observing eye to realise that size was not the issue in these types of structures. Indeed we do find larger temple plans such as Kasthamandap, which is 65 feet square. As the plan of Nyatapola is just 27 feet 6 inches square, one can surmise that Nyatapola could have been double its present size within the existing knowledge, or if the earlier temple size was sought to be exceeded. History is an interesting collection of events wherein the follower tries to out do its predecessor and its result in the case of architecture was a more magnificient and developed style. Since this aspect does not seem to apply to our builders, in the size aspect, probably size, per se, was never a criterion of temple design. Legends suggest that size of temples has a complex relation with the nature of ground, pattern of imaginary white Nagas underground, the time of building and its astral conditioning etc.

It cannot however be so easily observed that height was also not a point considered by these builders. But if we consider the system of deciding the number of tiers of any temple with reference to the deity to be enshrined, then height is just a product of the temple base and only governed by the rule of proportions. But at the same time we have quite a few temples raised on high platforms or raised on higher floors of certain palaces. Looking at each particular case we do find specific reasons. Sometimes height was a result of an entirely new directive of the king.

Sitting on a platform about 23 feet high, Nyatapola is often observed to be towering over the spectator. Similarly Taleju temple of Basantpur Durbar or the palace temple of Patan is elevated to over 20 feet. The reason why Taleju temple of Kathmandu was raised to such a height is understandable. There is a known historical story about the playmate relationship between the Malla kings of Kathmandu Valley and the Goddess Taleju Bhawani. This story gives a strong sentimental reason why this temple was raised so high. This temple plinth is set at the height of the royal games room and baithak of Pratapmalla. This is possible since this would cause least trouble to the Goddess coming every evening to play dice with the king. A similar reason can be forwarded to the case of the durbar temple of Patan, as that too was the king's private temple. The reasoning in the case of Nyatapola can however be controversial. Nyatapola was probably raised to its height because it had to be seen in relation to some room of king Bhupatindra Malla's 55-windowed Durbar, or in relation to the Bhairav legend from where the Nyatapola's sanctum level can be interpreted in relation to the first Gajur level of the Bhairav Temple of the same square.

What then was the Malla architect's purpose in temple form, for "purpose is the core of rational human conduct"?

Though housed in a temple, it was believed that god must be given an easy passage between heaven and earth and heaven was the sky. This particular belief about god demanded a temple form not reaching heaven, for a Hindu would never believe man can reach heaven physically, but facilitating God's flight to heaven. This, most nearly, is the phychology of Nepalese temples. Thus the visibly diminishing core size of these temples. For if it were just for structural stability, one feels little need for such large reductions in core size, which has created sizable structural problem. The diminishing core was based on the idea of a flying form and seemingly nothing else. One artistic manifestation of this idea is the flying birds at the roof edges. These birds in flight, invariably kept at roof ends, signify the lightness sought for in temple form. The above analysis of the Nepalese builder, based on certain historical stories and beliefs prevalent in Kathmandu leaves little doubt whether Pagoda is not a misnomer for Nepalese temples particularly as the aim was neither to build the tower form nor to have equal sized pyramids. Going into complexities of structure will throw these temples much wider apart. If the two styles of architecture are so different even in the psychology of external form, can they still have the same name ?

As more of the architecture of the East became known to the Western observers, the use of the term Pagoda became indiscriminate. The hemispherical Stupa also came to be referred to with the same name - most of the time due to similarity with names in local language. Thus the Dagoba of Sri Lanka is also referred as Pagoda. Similar extension of the terminology has been made to the Burmese style also. The difference between the solid Buddhist forms of Stupa and the Tiered Temples is such that there are no common grounds at all to have a common terminology.

How then should we describe our style ? Taking stock of such names as Nyatapola, Degu or Nautale Durbar ("Tale "or" Pola" both of which mean storey), do not "TIERED TEMPLES" [1] signify our temples better than Pagoda does ?

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[1] : To my knowledge the term "Tiered Temple" was first used by Dhooswan Sayami in his book 'The Lotus and the Flame', Department of Information, HMG, 1972.

PART I: TEMPLES.

CHAPTER I: VEDIC TRADITIONS AND THE TIERED TEMPLES OF NEPAL.

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VEDIC TRADITIONS AND THE TIERED TEMPLES OF NEPAL

Nepal's tradition in building with brick and wood, possibly in the tiered style (misnamed pagoda popularly), can be positively traced back to as early as 625 AD. In that year **Amshuvarma** repaired the temple of Matin (Patan's original name?, Matitar ?) which had been built earlier in brick and wood (Sundhara inscription of Amsuvarma).[1]

Temple building however, was already in vogue as early as 465 AD (**Lazimpat** inscription). [2] Elsewhere in **Tilaurakot** near **Lumbini** the Sakya towns were already in existence around Sixth century BC. [3]

As early as 3000 BC, **Mohenjodaro/Harappa** towns were extant in the Indus valley. This highly developed brick building culture faced waves of invasion and th earlier settlers and their ideas appear to have moved eastward from the Indus valley to **Narmada** and the Gangetic plains. There is enough evidence to suggest that the major portion of late Vedic architecture developed through the resurrected use of brick and wood.

The **Scythian** invasion of the Indo-Gangetic plains around 3rd century BC pushed forward from the northwest and with it, concepts and followers of brick architecture moved towards the northeast (Nepal area), east (Gaya area) and southwards (Ter area). The architecture of the original brick country got gradually stonized following the stone doctrine of **Ashoka**. The **Guptas**, who ruled the same general **Mauryan** area later continued working in stone.

In the Gangetic plains, queer religious associations seem to have developed with building materials. When the Buddhists got closer to stone, Hindus took to brick (Mauryan era) and the reverse situation followed in the Gupta era and after.

Developments in Nepalese architecture should be seen in the above context of changes in the Indo-Gangetic plains particularly since movements and influences from the north of the Himalayas started being appreciable only after 8th century AD. Hindu ideologues pushed by the changes in the Gangetic plains, started northward movements setting the path for ideas and influences trading between the plains and the Nepal hills.

Following this period successive changes in the parent field reinforced the role of Nepal as a sanctuary and depository of the purest Vedic ideas and crystallized the form of Hindu temples in Nepal. Though the Nepalese architecture is far more developed than those in the Kashmir and Himachal hills in north India and Karnataka, Kerala and the Malabar coast in South India, they do exhibit similarities in form and detailing basics. [4]

The similarities could have only come about as a result of common origin. The Vedic thoughts and concepts of the Gangetic plains of the 1st millennium BC is th common starting point. Development of artistic symbolism in the Nepalese tiered temples was heightened through the mix with Tibetan influences from 10th through 18th centuries AD.

The proto-Hindu temple form symbolized th centre of the universe, the mountain Meru, above which the god reside. To the south of the mountain lived the humans. This concept of the human world being to he south of mount Meru is correlated to the location of Vedic settlements on the Gangetic plains south of the Himalayan range.

The temple plan was derived from the conceptual geometric diagram of the centre of this cosmic structure, called the Mandala. Its elevational concept likewise was geometrisization of the elevation of mount Meru.

This proto-temple form reference, the regular pyramid in the centre of a circular lake, generated the circumambulation concept as a first preparatory step to the worship of god in a temple. While circumambulation was a physical need, it was theorized into a spiritual purpose of absorbing and paying homage to energy radiant from the centre of the temple. [5] No temple is oriented to the north as the human settlements, thence the pilgrim's approach, are to the south of the mountains.

The temple structure with its central axis pointing towards the sky provide the conceptual transition from the heavens to the temple, where godly energy temporarily resides for the purpose of worship on earth. Though only a few temples are built physically in the middle of a lake, all temples in Nepalese tradition are conceptualized as being circumscribed by a sub-terranean waterbody.

This is substantiated by the rituals associated with the study of the temple site which, among other aspects, includes a picturization of the underground formation of white Nagas representing the water element. [6] As this aspect is not considered in Indian rituals, the Nepalese tiered temples are the only Hindu temples where the original concept of lake around the mountain is, at least, ritualistically followed.

To the layviewer the concept of waterbody circling the temple is symbolically presented. The corner strut in each roof corner of every temple always depicts a Vyala, [7] a winged horselike aquatic creature. At various levels , the entablatures depict **Nagpasa** the snakechain. Likewise the temple Toran always carries the **Makara** images in lower corners, representing water and entry to and exit from a spiritual setting.

The tiered temples are exclusively built of wood and brick. Today, only traces of brick building heritage can be found in the original Vedic domain of the Gangetic plains. While in Nepal, uninterrupted till the mid-nineteenth century, the Nepalese builder remained the sole upholder of the pure and simple Vedic tradition continuously using the same materials of brick and wood, the development being confined to the progressive perfection of the outer embellishment and technology. It must be a laurel on Nepalese builders that they could continue development for one and a half thousand years without tampering with the purity and simplicity of the conceptual framework despite the temptations and challenges of changing cultures to the south. [8]

The Kathmandu Valley skyline owes its character to the hundreds of temples with their multiple pyramidical roof tiers. The majority of these extant temples were built in the late Malla period (15-18th century AD). The oldest surviving tiered temple, positively dated through existing inscriptions to have been built in 1391 AD, is the five tiered Kumbheswor temple in Patan. Given its grandeur and height this could hardly be the first attempt.

The tiered temples are built with brickcore walls, square in plan in each level and the size of the core dimishing in the upper floors in proportion to the floor below. Often the core wall of the first floor is continued to the sanctum level to create a circumambulatory path around the sanctum. The outer wall are in other cases replaced by a colonade of a odd number of bays (3 or 5). Each core wall has a projecting sloped square roof at the level of plan change. However the tiered temples do not have internal floors in the upper levels nor are there any stairways to reach the upper levels.

The brickcore in the sanctum level is pierced by large doorways in each cardinal direction though only one of these doors is generally opened for use. In the upper levels an odd number of windows is put in each face is axial symmetry to the plan. The brickcore wall is further punctuated by horizontal band timber inserts at various levels with varying motifs, Nagpasa, Narapasu and other cornice ledge bands are some such breakers of brickmass. [8]

The sloping roofs are supported in these core walls by sloping wooden tunals (struts) richly carved in figures of divinities. The corner struts, which always carry the same imagery in every roof cover of every temple, represent a fierce aquatic, though winged, animal (the Vyala). Th receding walls and the correspondingly decreasing size of the roofs seen from a low view point give the characteristic appeal of these tiered temple. Because of this low view point, the visual impact of struts is extraordinary.

The simplicity of the building structure and its stark plain interior contrast with the magnificent carvings of doors, windows, colonades, struts and architraves. Sun on the roof surfaces and deep shadows on the wall resulting from the large roof overhangs give an ethereal impact on the viewers and believers alike.

The topmost roof of these temples are crowned by a gajur (finial) at its geometric centre, a symbol of the cosmic axis pointing to the heavens. Though the usual material of roof covering is small side locking flat tiles laid in mud over wood shingles on structural timber rafters, it is usual for the topmost tier to have a metal sheet cover. These roofing sheets are often gilted.

Sometimes the main doorways are also covered in pressed gilted metal, silver or copper sheets duplicating in toto the design intricacies of the wooden carvings. The glitter and the interplay with sunrays in the mornings and evenings on the doors and the roofs in the daytime create variation in diurnal impact.

The building of temples with high stepped multiple plinth is a late Malla period variation. [10] This led to further lowering of the view plane and heightened the feeling of heavenward reach to the roofs. The Taleju of Kathmandu Durbar Square built in 1564 AD and the Nyatapola of Taumadhi Square in Bhaktapur built in 1702 AD are excellent examples of such temples. Equally grand temples have been built on a single plinth exemplified by Kumbheswor in Patan, Pashupatinath in Deupatan and Changunarayan in Bhaktapur.

The apparent frailty and softness of detail sometimes missed the viewer to think that earthquakes might cause havoc with these structures. The contrary has been proved by the experience of the great earthquake of 1934 AD, when no tiered temple was totally levelled, the damage contained to the collapse of the topmost or two top tiers. This structural strength is derived through meticulous construction detailing, perfected through centuries, capable of dampening earthquake force subtly.

NOTES AND REFERENCES

[1] Regmi, D.R. Inscriptions of Ancient Nepal, Abhinav Publications, New Delhi 1983. Inscription No. 76.

[2] Regmi, Inscription No. 3. The temple has been qualified with adjectives possibly indicating a standard design. (e.g. in the shape like of Laxmi).

[3] Rijal B.K. Archaeological Remains of Kapilvastu, Lumbini and Devadaha, Educational Enterprizes, Kathmandu, 1979.

[4] For details see: Banerjee N. R. Nepalese Architecture, Agam Kala Prakashan, Delhi, 1980.

[5] Mitchell, G. The Hindu Temple, B.I. Publications New Delhi 1977. See page 61 - 72 for details.

[6] For this reason temple sizes have often been restricted. The snakes are often pictured as surrounding the temple so that the tail enters the open mouth. There may be a parallel between this concept and the creation myth.See: Newmann, E. The Origins and History of Conciousness, Princeton University Press, 1973..

[7] The parallel element in South India is possibly "Yali"- Brown. P, Indian Architecture, Taraporewala, Bombay 1965. Page 139.

[8] In India even stellar temples have developed. See: Grover S. The Architecture of India, Vikas, New Delhi, 1980. Page 206.

[9] The breakers were probably used for structural needs also. The brickmass when divided into smaller panels is more resistive to earthquakes in the building method used. We find undecorated timber bands at various levels in the interior of the temple walls also.

[10] Taleju of Kathmandu is the first significant multiplinth temple constructed in the valley. I do not think multiplinth temples have been derived from or based on "Edduka′ temples as discussed by Banerjee, N. R. in Nepalese Architecture.

PART I: TEMPLES.

CHAPTER II: TIERED TEMPLES: A COSMOLOGICAL OVERVIEW.

THE TIERED TEMPLES - A COSMOLOGICAL OVERVIEW

The origin of the tiered-[1] Temples of Kathmandu Valley is yet uncertain. Indeed there is no saying exactly when such a style of temples started being used even in terms of historical periods. It can, however, be said with fair certainty that though various dynasties such as the Gopalas, Kirats, Lichchhavis, Thakuris and the Mallas ruled the Valley successively in the past, the basic temple form was carried on without any change. This by itself is ample proof to infer that the form of our temples was guided by concepts beyond any one king or craftsman. A curious fact of history is that the Valley has always been ruled by Hindu kings, whereas the craftsmen were either Buddhists or Hindus. The precepts of these temples therefore, must have been Hindu ontology, otherwise the cultural non-interference of the ruling class would be hard to explain.

The tiered temples use one plan form - the pure square. Exceptions to this are few and also do not go back far into history: (a) the non-conformist temples of Bhimsen and Bhairab have been styled on rectangular plans-[2], (b) the hexagonal temples of the early Shah period based on equilateral triangles, (c) the octagonal temples based on two concentric squares with one rotated at 45 degree or diagonally oriented. Apart from these exceptions, of which only the first mentioned is of any major significance, the use of the square as Hindu principle of temple design is universal.

The Plan Form - Square

Imperfection being the created nature of man and perfection the Godly quality, the first builders of the temples had the unenviable task of erecting a perfect structure for the abode of God and this knowing that God's abode being away from earth would be beyond the view of mortals. Such anamoly was faced by one and all on earth at one time or later whethr Hindu or otherwise. The two forms most commonly used by man to house or represent God, the Godly Ghost, the God Kings or even God-men have been the Square and the Circle. The Square was used as much in Assyrian Ziggaruts, Egyptian Pyramids and Aztec temples as in Hindu temples here or elsewhere. The Buddhists used the circle. If we go beyond temples, we find cities of various times and faiths planned on the basis of squares. The Aryan town-planner used this in Vedic cities as exemplified by Hindu manuals complied later. "In this city, three main streets would run north south and another three in east-west directions-[3]. (We shall come back to the significance of this 3 grid-iron principle later). The city of Peking was based on a Square. In the Valley, the city of Bhadgaon was based on such principles-[4].

The persistence of these forms in ancient thoughts of humans should point to their cosmologically perfect constitution. For man, circle was evident everywhere in the cosmos as far as his eyes could penetrate. Thus the acceptance of circle or sphere as a form for God´s abode or Godly representation may be easily concluded. The Hindu philosophers, however, attributed "movement" to the circle and as a result the form was discarded. Though the circle may be a finity form, the infiniteness of symmetry and non-existence of cardinal directions has philosophically prompted the Hindu seens to conclude the unsuitability of this form. Indeed the circle has been taken to symbolise the cosmos in its entirely. The finiteness of Earth was represented by the square (a polygon of equal sides jointed at right angles) with its limited symmetry, cardinality and a definitive center-[5]. Indeed the very anti-thesis of trying to house the eternal, all prevading one-in-all and all-in-one reflects the choice of the earth symbol as the most satisfactory form for the abode of God. In trying to define the underfinable, he might have taken the form whose definition is not lost from any cardinal direction.

The principles of Hindu architecture has been identified in "Vastushastras" of Vedic period (transmitted by "Sruti" and compiled later). The most important postulation is the concept of "Vastupurusamandala" - a unified design principle based on the square. Literally though "mandala" may mean center and circle, it may be more meaningfully translated as a "group around a center". "Purusa" is man but is better taken to mean the energizing power of vision-[6]. "Vastu" is of course architecture. The vastupurusamandala can therefore be taken to mean a way of evolving a conditioned existence based on the symbol of unconditioned essence, or a way of divine incorporation-[7] through personification of the cosmos.

At least 32 vastupurusamandalas have been constructed in the vastushastras by presenting a pure square either as one of divided into 4, 9, 16, 25 etc. upto 1024 squares (called padas). Apart from the simple division of the square into smaller squares and location of the Gods within the square and their interrelations, these vastupurusamandalas have not been interpreted extensively. The use of these mandalas has however been extended beyond the 1024 square model in many Hindu temples in India. So extensively has this been used in the large temples of India that the purity of the outermost envelope as a square is totally destroyed. Whether this was intended or not is now unimportant but the credit of using the vastupurusamandala not as an art form but as a start and uncompromising symbol of the supreme personality will always go to the temple builders of Kathmandu. They apparently restricted themselves to using only those vastupurusamandalas which are divided into odd number of squares e.g. 1, 9, 25, 49, 81, 121, ... 961. Of these, observation of major temples in Kathmandu suggests, the most commonly used one was of 81 squares.

Divested of ornamentions e.g. carvings, windows etc. and aspects developed solely due to structural and constructional needs such as struts etc. two aspects of the tiered temples are of utmost importance: the roof form and the square plan. The square plan was developed out of the vastupurusamandala and the tiered roof forms may also have been carried over from the "vastushastras". Such tiered, duplicated roofs have been referred to in the "vastushastras" as derived from the named after the mountains such as "Himavan" and "Malayavan"-[8].

Indeed for the Nepalese temple designer nothing would be more inspiring as the mountains for roof form since the mountains were often referred to as places of earthly sojourn for the Gods themselves. This inspiration is stretched by some as the basic reason for the development of the mandala itself-[9]. Indeed if such be the case, the origin of the style of our temples may have occurred here only and thence exported to other areas in Asia.

A casual observer of the tiered temples of Kathmandu may see no particular preference for odd or even number of tiers in these temples - the most common temples today have one, two or three tiers. I would, however, think the basis of odd number or divisions to develop the plans as well as elevations of the tiered temples is not a casual happening. This can be observed in any temple whether conformist or not, that the three basic philosophical necessities of any temple e.g. the cell (the conditioned existence) the center (Ananta or eternity) and the gajur (the crowning glory and pointers to heaven) are derived out of the use of odd divisions or numbers. Indeed even the two or four storied temples-[10] exemplity the affinity to odd numbers. The number of gajurs in the rectangular temples is another proof of this affinity to odd numbers-[11].

Before we start explaining the tiered temples and their proportioning, therefore, it would be necessary to understand the cosmological attributes of numbers explified by Hindu thought. Their knowledge of mathematics and numbers are hardly disputable. It has been interpreted that three basic numbers, 2, 3 and 5 respectively represented feminity, divine masculinity and human masculinity. Indeed the whole mathematics of music or cosmology seems to be worked on the basis of $2^p . 3^q . 5^r$ (e.g. Kaliyuga 432,000 years i.e. $2^7 . 3^3 . 5^3$). "Though mathematical harmonics remain conjectural, the evidence conclusively suggests that it constituted a highly developed system similar to western topological mathematical groups"-[12]. The theory of three divine axes for the development of temple plan may be derived from the fact that number three represented divine masculinity. Even the four-faced lings of Pashupatinath is conceived to have the formless fifth above thus representing the five "Amnayas"-[13]. The number 7 as an exponent representing Agni in Rigveda and Vishnu in Gita, 5^7 would mean the sun in heaven. Such examples are many and without citing anymore the importance of the use of these numbers (with positive or negative exponents)-[14] is

The persistence of these forms in ancient thoughts of humans should point to their cosmologically perfect constitution. For man, circle was evident everywhere in the cosmos as far as his eyes could penetrate. Thus the acceptance of circle or sphere as a form for God's abode or Godly representation may be easily concluded. The Hindu philosophers, however, attributed "movement" to the circle and as a result the form was discarded. Though the circle may be a finity form, the infiniteness of symmetry and non-existence of cardinal directions has philosophically prompted the Hindu seens to conclude the unsuitability of this form. Indeed the circle has been taken to symbolise the cosmos in its entirely. The finiteness of Earth was represented by the square (a polygon of equal sides jointed at right angles) with its limited symmetry, cardinality and a definitive center-[5]. Indeed the very anti-thesis of trying to house the eternal, all prevading one-in-all and all-in-one reflects the choice of the earth symbol as the most satisfactory form for the abode of God. In trying to define the underfinable, he might have taken the form whose definition is not lost from any cardinal direction.

The principles of Hindu architecture has been identified in "Vastushastras" of Vedic period (transmitted by "Sruti" and compiled later). The most important postulation is the concept of "Vastupurusamandala" - a unified design principle based on the square. Literally though "mandala" may mean center and circle, it may be more meaningfully translated as a "group around a center". "Purusa" is man but is better taken to mean the energizing power of vision-[6]. "Vastu" is of course architecture. The **vastupurusamandala** can therefore be taken to mean a way of evolving a conditioned existence based on the symbol of unconditioned essence, or a way of divine incorporation-[7] through personification of the cosmos.

At least 32 **vastupurusamandalas** have been constructed in the **vastushastras** by presenting a pure square either as one of divided into 4, 9, 16, 25 etc. upto 1024 squares (called **padas**). Apart from the simple division of the square into smaller squares and location of the Gods within the square and their interrelations, these **vastupurusamandalas** have not been interpreted extensively. The use of these **mandalas** has however been extended beyond the 1024 square model in many Hindu temples in India. So extensively has this been used in the large temples of India that the purity of the outermost envelope as a square is totally destroyed. Whether this was intended or not is now unimportant but the credit of using the **vastupurusamandala** not as an art form but as a start and uncompromising symbol of the supreme personality will always go to the temple builders of Kathmandu. They apparently restricted themselves to using only those **vastupurusamandalas** which are divided into odd number of squares e.g. 1, 9, 25, 49, 81, 121, ... 961. Of these, observation of major temples in Kathmandu suggests, the most commonly used one was of 81 squares.

Divested of ornamentions e.g. carvings, windows etc. and aspects developed solely due to structural and constructional needs such as struts etc. two aspects of the tiered temples are of utmost importance: the roof form and the square plan. The square plan was developed out of the vastupurusamandala and the tiered roof forms may also have been carried over from the "vastushastras". Such tiered, duplicated roofs have been referred to in the "vastushastras" as derived from the named after the mountains such as "Himavan" and "Malayavan"-[8].

Indeed for the Nepalese temple designer nothing would be more inspiring as the mountains for roof form since the mountains were often referred to as places of earthly sojourn for the Gods themselves. This inspiration is stretched by some as the basic reason for the development of the mandala itself-[9]. Indeed if such be the case, the origin of the style of our temples may have occurred here only and thence exported to other areas in Asia.

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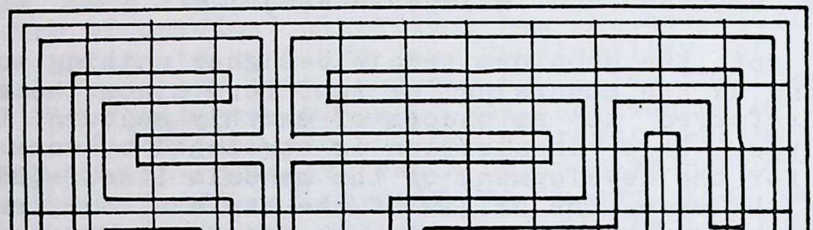


2.1. CHOWSHATTHI MAHADEV, PASHUPATINATH.
generated from EKALINGATOBHADRA diagram.

SRT

established. Their use in the mathematical computation of the temple form from the design module, the type of God housed and the vastupurusamandala should appear as a logical development.

The Mandala Proper

Based on the symbolic attributes of the numbers stated above and the various vastupurusamandalas identified, it may be construed that the even-padas mandalas may be for use in temples representing the eternal or Ananta or Brahma (Brahma, however, being the creator, though revered, is not a God for whom temples are usually built). In this category of mandalas may be listed mandalas with 4, 16, 64, 100, 196, 256, 400, 484, 676, 784 and 1024 padas. In this series of even-padas vastupurusamandalas, the mandalas with 36, 144, 324, 576, 900 are not included because they resolve into some form of $2^{p}.3^{q}$ and thus resulting into conflicting male-female devinity. Practical observation in the Valley shows that a hundred and forty-four padas vastupurusamandala has been used to construct a maze of Shiva-[15]. Apparently, this represents the eternity viewed from the fact that "Siva" actually and philosophically is represented by the image of a linga in union with Yoni (or a harmony of prakriti and purusa) - thus creating a strong case of using a even pada mandala. The "tandav-nritya" (ceaseless dance of Siva) signifying evenchanging nature or the eternal present may have been intentionally depicted by even-pada mandalas without the Brahma of the central square but with the dimensionless, timeless, eternal and common intersection of the three devine axes, center. Theoretically therefore only images of Brahma and Yoni-linga combination symbol could be centrally put in any temple of even padas mandala. But the surprising fact that this has not been done in any temple of Kathmandu is a definite proof that despite the above, the preference of the Nepalese temple builder has been the odd-padas vastupurusamandala always.

Number of Tiers

Having discussed the plan from and the general elevational forms, the most obvious second query to understand the Nepalese tiered temples must be asked.

How many tiers in a temple should there be for a particular god? Or, how high should it go and in how many defined stages?

Experts have different views. According to Yogi Naraharinath-[16] the deities to which shrines venerated by Hindus are usually dedicated as follows:

One storey - Siva
Two storeys - Ananta, Indra
Three storeys - Ananta, Siva, Bhaskara

Four storeys - Ananta, Siva, Vishnu, Surya
Five storeys - Ananta, Siva, Vishnu, Surya, Devi
Six storeys - Ananta, Siva, Vishnu, Surya, Devi, Ganesh
Seven storeys - Ananta, Siva, Vishnu, Surya, Devi, Ganesh, Kumar.

This is difficult to substantiate when existing temples are checked on this system. Indeed on the above theory all Devi temples would be five or more than five storeyed. A more likely system is found in the evaluation of Madan Mohan Mishra-[17]. He contends that the temple and the house of man were conceived on identical principles of Vastu-system, the system being based on the body-supreme of man. He argues that "since the gods in the body can be seen through meditative concentration", the bodily **chakras**, their God′-parallel, the Devi equivalent and their numerical tier position would be as follows:

Number of tiers	Chakra	Male devinity	Female devinity	Risi
1.	Adhar	Ganesh	Siddhi, Buddhi	Kurma
2.	Swadhisthan	Brahma	Savitri	Barun
3.	Manipuraka	Bishnu	Laxmi	Bayu
4.	Anahata	Rudra	Uma	Hiranyagarva
5.	Visuddha	Jeeb	Avidhya	Birat
6.	Aagya	Agni	Susumni	Hamsa
7.	Sahasradal	Guru	Chaitanya	x

The system of the chakra and their rising energy can be reversed to show the equally true divine radiation from above or **sahasaradal** (procreation and perpetration being parts of one etrnal closed continuum) and M.M. Mishra′s chart shown above could be constructed as follows :

No. of tiers in temple	God involved or housed
1 or (7)	Guru, Ganesh, Siddhi, Buddhi, Chaitanya
2 or (6)	Brahma, Agni, Savitri, Susumni
3 or 5	Bishnu, Jeeb, Avidhya, Laxmi
4	Rudra, Uma

Thus a Siva temple could be 3, 4 or 5 tiered (linga and Yogi image temples, however, being 2 or 6 also). Since only temples upto five tiers are standing today and there is no historical

reference either or higher temples, we need not bother about 6 or 7 tiered temples. That the above is true is found from the following examples :

4 tiered temples now existing

Bhagabati at Nala - dedicated to Uma or Bhairabi
Harisiddhi Bhavani - tantric origin though may be equated to Uma
Uma-Maheswora at Kirtipur - Uma-Maheswora (damaged in 1934, unrepaired)

5 tiered temples now existing

Kumveswor at Patan - Jeeb or Siva or Earth Symbol
Nyatapola at Bhadgaon - tantric origin (Ajima) God-mother

(The temple of Pashupatinath may have been originally 5-tiered - each tier representing one face of the image).

Proportioning the Temple Plan

The proportions of the tiered temple plans can be started once the actual vastupurusamandala used for the particular temple is known. Practical analysis of the existing temples measurements indicate the following possibility :

The design module (pada for the mandala) of the temple can be worked out by dividing the side measurement of the lowest and the largest roof square by 2n - 1 where n equals the number of tiers in the temple when odd or number of bays in the lowest core when tiers are even-[18].

The artisan's working module can be observed from the smallest temple embellishments: the lion faces (Simha-man) motifs which are always of equal numbers in each face. A standard design module used in the sanctum floor is used in deciding the sizes of cores and roof above. To find the size of roof immediately above any roof, one just has to reduce the larger by a number of padas a third fraction of a pada, and the same holds true for consecutively reducing cores. As far as the artisan's working dimensions is connected it seems to depend on the strut division in each floor, though this is more a result of structural consideration than the mandala.

Whether a particular temple ues a odd-pada or even-pada mandala can be seen from the positioning of the struts and the divisions, they made on the core. In the case of Nyatapola the divisions so made are 5, 5, 3, 3, 1 upwards, in Taleju Kathmandu, this is 5, 3, 1 in Tunaldevi 3, 3, 1 Bhimsenthan Patan 5, 5, 3 Bhairab Temple Bhadgaon 5, 7, 7 etc. whereas the essential theoretical core relationship should be 11, 9, 7, 5, 3 or 9, 7, 5, 3, 1 for Nyatapola 5, 3, 1 or 7, 5, 3 for Taleju and Tunaldevi. I would venture to add that in almost all cases the practically necessary number of struts being less than the theoretical requirement, the practice may have won over theory in the long run. Notwithstanding this, the number of divisions still being maintained is odd. Therefore, a definite conclusion can be drawn that the mandalas in each floor may differ only so long as they still are odd-padas mandalas.

NOTES AND REFERENCE

1. See Introduction.

2. Sudarshan Raj Tiwari, "The Non-conformist Temples", The Rising Nepal, 30 November, 1973.

3. Satish Grover, The Architecture of India (New Delhi: Vikas Publishing House Pvt. Ltd., 1980), p.19.

4. Leelabhakta Munangkarmi, Mallakalin Nepal (Kathmandu: Ratna Pustak Bhandar, 1968), p.2.

5. The need of the center is very important as it symbolises the beginning of creation and Bramha, the creator.

6. The Geeta, SV, Purushottamayoga.

7. Jose and Mariam Arguelles, Mandala (Berkeley: Shambala Publications, Inc., 1972), p.65.

8. Shantaram Bhalchandra Deo, Glimpses of Nepal Woodwork, ed., U.P. Shah (Calcutta: Indian Society of Oriental Arts, 1969), p.12.

9. Ronald M. Bernier, The Temples of Nepal (Kathmandu: Educational Enterprises, 1970), pps.11, 12, 18.

10. The Temples of Nala Bhagabati and Harisiddhi Bhavani are the only two four-tier temples still standing today.

11. S.R. Tiwari, The Non-conformist Temples.

12. Antonio T. de Nicolas. Avatara (New York, Nicolas Hays, Ltd. 1976), pps.284-299. His ideas have greatly inspired in writing this report.

13. C.R. Swaminathan & K.R. Aryal, "Religious Trends in Nepal's History", in Cultural Heritage of Nepal, ed. R.S. Verma (Allahabad: Kitab Mahal, 1972), p.19.

14. Negative exponentials indicate static and/or demonic property.

15. The ´chausatthimahadev´ at Pashupatinath. This vastupurusamandala compares very well with the I Ching ´Mandala of the 64 kua´ Ref. Arguelles, Mandala, p.65.

16. As quoted by Bernier in The Temples of Nepal, p.13.

17. Madan Mohan Mishra, Nepalese National Iconography, pps.5, 25, 26.

18. Sudarshan Raj Tiwari, "The Revivalist Trends in Nepalese Architecture", The Nepalese Perspective, November 1973.

PART I: TEMPLES

CHAPTER III:KIRTIPUR: SOME THOUGHTS ON ITS TIERED TEMPLES.

KIRTIPUR

SOME THOUGHTS ON ITS TIERED TEMPLES

INTRODUCTION

Though the township of present Kirtipur was settled by king Shiva Deva II (reignal period 1099 - 1126 AD), its history as a temple site/fortification is much older. Its earlier names of Padma Kastha Giri, and Padma Kuta Giri has been said to have pre-kirat period origin and was in use during Lichchhavi period (Pradhan). Of particular interest is the site of Bagh Vairab Temple where early Lichchhavi sculptures have been found (Bangdel). The Kirati name of the resident god of Bagh Vairab site was Gunde and the reference to Gundi Kvatha in 1242 AD suggest that fort settlement was already in place by then.It is of interest to note that the suffix "Gun" was used by the kirats to indicate a forested hill fort (Bista). Also the change of name from Padma Kastha Giri to Padma Kuta Giri indicates the changing role of the hillock from a fuel and fodder hill for a nearby settlement to a hill with settlements. Despite these pointers it is difficult to believe the speculation that Chitubihar stupa is of Ashokan origin particularly as Gunde hillock was a Kirati fortification and conversion of Kiraties to Buddhism was a much later phenomenon (Bista).It is therefore most likely that the minor Lichchhavi hill fortification was expanded into a satellite town by Shiva Deva II.

RELIGIOUS PLANNING OF KIRTIPUR

The layout of the township of Kirtipur show strong relation to religious planning thought. It is possibly the only town planned in Malla period where a segregation of the Buddhist and Hindu sectors of the town has been attempted. The Hindu sector of the town (Devarata or Devagala) is to the west of the central place Bagh Vairab and town tank (devpukha) corridor and the Buddhist sector (Sivarata or Sivagala) to the east. This rare division probably is a result of the religious disagreements that could have been a part of the historical confusion of the 8 - 12 th century Kathmandu valley. However, if we look into the street layouts both the sectors are fully integrated into a plan reminiscient of city laid out on vedic rules: three parallel streets on both N-S and E-W directions crossing each other within the area bounded by the edge roads. As a classical defence town all the roads leaving the township change directions on the "swastika basis" (Reinhard). The major religious determinants of the town as a whole are Hindu principles eg.location of Siva, Vishnu, Ganesh and Shaktipiths are symmetrically spread out on both the Devagala and Sivagala sectors. (for details, see Reinhard) . It appears that the total township was planned within a Hindu envelope and town sectors separated only for social purposes (cf. dewali of hindu Pradhans takes place in Chilancho area). In looking at the total plan of the town the Gutapau area, where the local people believe a 9 - storeyed temple existed long back in the past, needs a closer scrutiny. Remains of wide foundations are common place in this area.

TEMPLES OF KIRTIPUR

Kirtipur has a very large number of religious "piths" and sites of which only a few have built structures. These structures show a large veriety of style. The Bagh Vairab temple and the Umamaheshor temple are the two temples built on the tiered style (misnomer pagoda). The Chitu Bihar (Chilancho) is on classical stupa style. The Narayana temple is on a Rana period dome style as repaired during the primeministership of Bhim Samsher though its original form was three tiered. Almost all subsidiary temple structures in the Bagh Vairab courtyard also were changed in Rana temple style. There are two shikhara style temples; the Lohn Dega and Shakyamuni Buddha Mandir both dedicted to Buddha. In this paper we will only consider the case of the temples of Umamaheshor and Bagh Vairab. Also discussions are confined only to the main structure of these temple complexes.

UMAMAHESHOR TEMPLE

Located at the westend of Kirtipur the temple is sited just below the highest point (left for Taleju che, the clan goddess of the royalties). The image of Umamaheshor (Bhawani Shankara) was installed in 1654 AD and the structure should have been completed by 1654 or slightly before that date (Shrestha). The elephants at the bottom of the flight of stairs of the main temple were installed in 1662 AD and possibly the main gate was built and the courtyard paved in 1717 AD.

Since its construction the temple of Umamaheshor has been ravaged by two great earthquakes (1833 AD and 1934 AD). When Oldfield visited Kirtipur in 1855, the temple was in disrepair possibly as it had remained unrepaired after the earthquake of 1833. It has been said that the temple was four tiered, as repaired during the time of Bhim Samsher, before the earthquake of 1934 felled its top two tiers. It was repaired into a three tiered corrugated iron roof temple then. The third roof was blown away by a storm in 1948 and only in 1982 the temple was repaired to its current shape with Jhingati roof. Its long history of disrepair and unprincipled repairs have changed the shape of Umamaheshor temple greatly. Only the core wall of the sanctum level, its carved doors and the images inside remain true to original. The paved courtyard, its multi-stage plinth, its guardian elephants, Vairab and Kubera and the gate to the temple court are also fairly true to original.

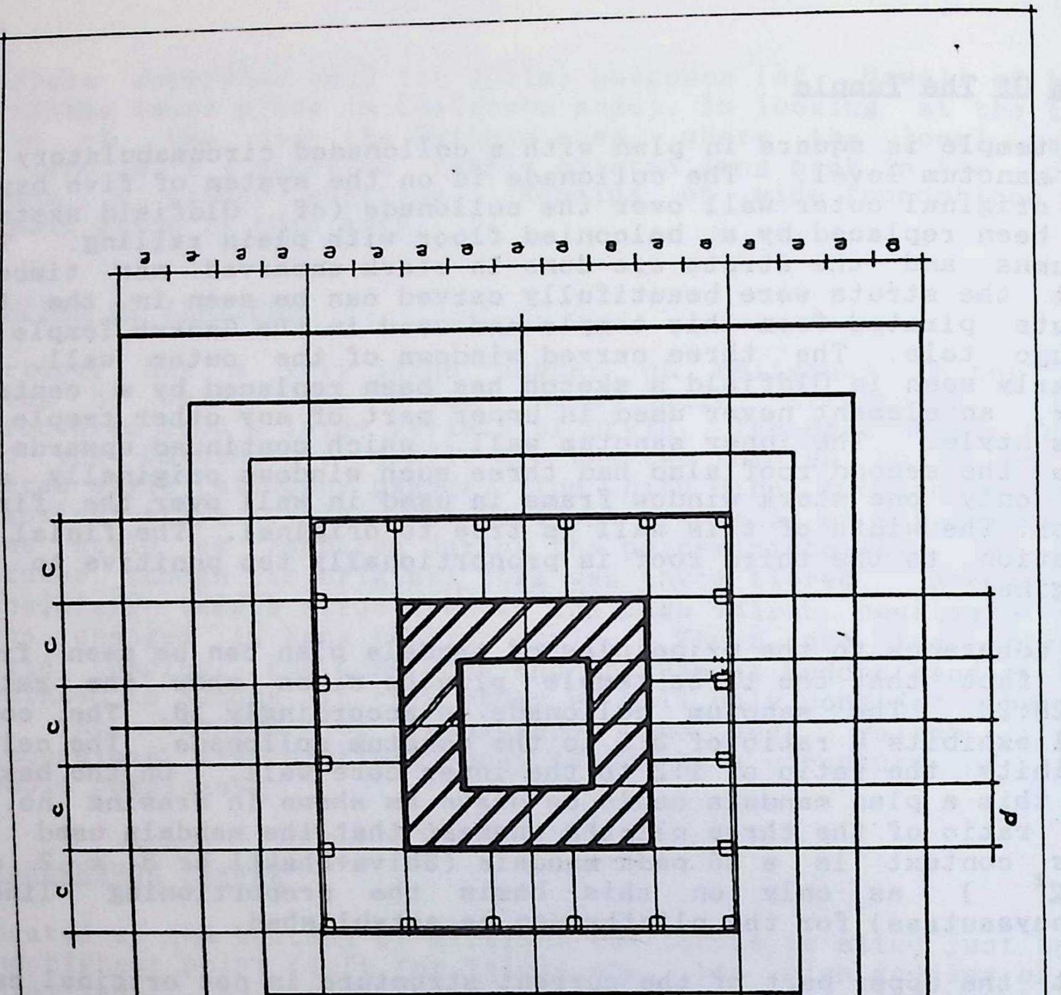
Form Of The Temple

The temple is square in plan with a collonaded circumabulatory in the sanctum level. The collonade is on the system of five bays. The original outer wall over the collonade (cf. Oldfield sketch) has been replaced by a balconied floor with plain railing. The columns and the struts are done in stark uncarved new timber. That the struts were beautifully carved can be seen in the two struts pirated from this temple and used in the Ganesh Temple at Dabujo tole. The three carved windows of the outer wall, so clearly seen in Oldfield's sketch has been replaced by a central door, an element never used in upper part of any other temple of this style. The inner sanctum wall, which continued upwards to take the second roof also had three such windows originally and now only one stark window frame in used in wall over the first floor. The width of this wall is true to original. The finial in relation to the third roof is proportionally too punitive to be original.

An adherance to the principles of mandala plan can be seen from the fact that the three temple plinths sides show the ratio 34:28:23. The sanctum collonade is accordingly 18. The core wall exhibits a ratio of 3:5 to the sanctum collonade. The cella exhibits the ratio of 1:2 to the inner core wall. On the basis of this a plan mandala could be drawn as shown in drawing no.1. The ratio of the three plinths suggest that the mandala used in this context is a 36 pada mandala (Shiva+Shakti or 3 x 2 or $3^2 . 2^2$) as only on this basis the proportioning lines (Vinayasutras) for the plinths can be established.

That the upper part of the current structure is not original can be seen from many missing or misrepresented elements. From a study of other temples of the time as well as earlier built in the tiered style ,such missing elements can be listed:

a) Immediately below the take off point of struts the usual course of moulded bricks (Baapa type Mvahapa and Khalapa) culminating as dogeared bricks at the four corners (Lhahka Lhahpa) supported by the fisted hand element (Lhahphvah) is totally missing in all the three levels. Immidiately below such a layer, the band of lion faces projection course (Smihamvah) so typical of the tiered temples is also missing. Likewise under the band of lion faces, the Nagapasa band and the lotus petal band should have been all round the temple. These missing elements have greatly affected the proportions of the temple. If we examine the length (76") of the two struts at the Ganesh temple we see that such band would be needed and the angle between the strut and the wall would be more than the current angle. (See Drawing no.2).


a
b
c
d
a = L/9.
b = a/4
c = L/5
d = 3c/4
division basics to derive all sutras in temple plan
0 1 2 3 4 5 meters.
SRT

3.1. PLAN of UMA-MAHESHOR - THE MANDALA and SUTRAS.

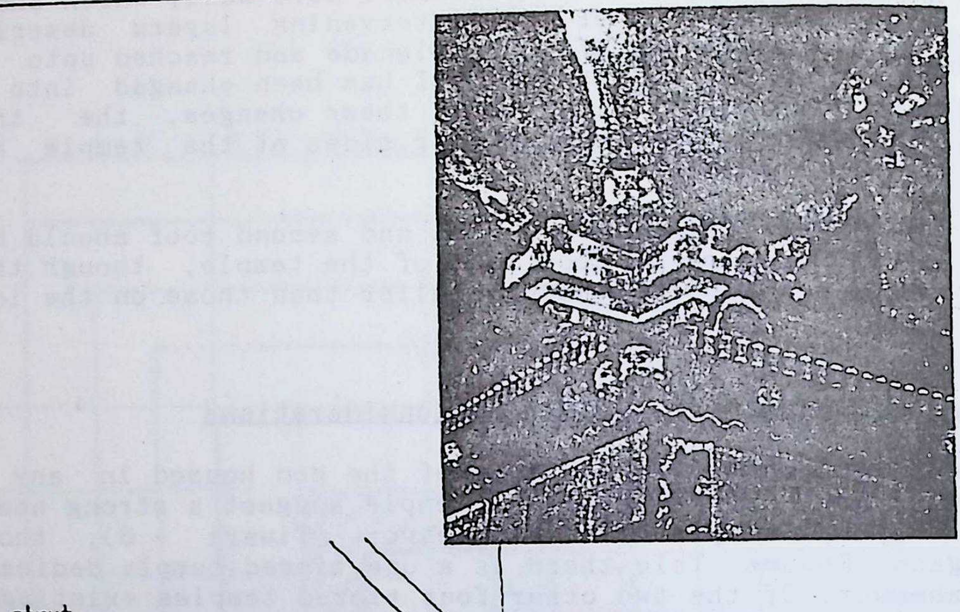
(b) In the sanctum level, the outer core wall, which should have started after the intervening layers described above (a) on top of the collonade and reached upto the underside of the first roof has been changed into an open Verandah. Along with these changes, the three windows on each of the four sides of the temple have also vanished.

(c) Again the wall between first and second roof should have three windows on each side of the temple, though these would be proportionately smaller than those on the lower wall.

Number Of Tiers And Theoretical Considerations

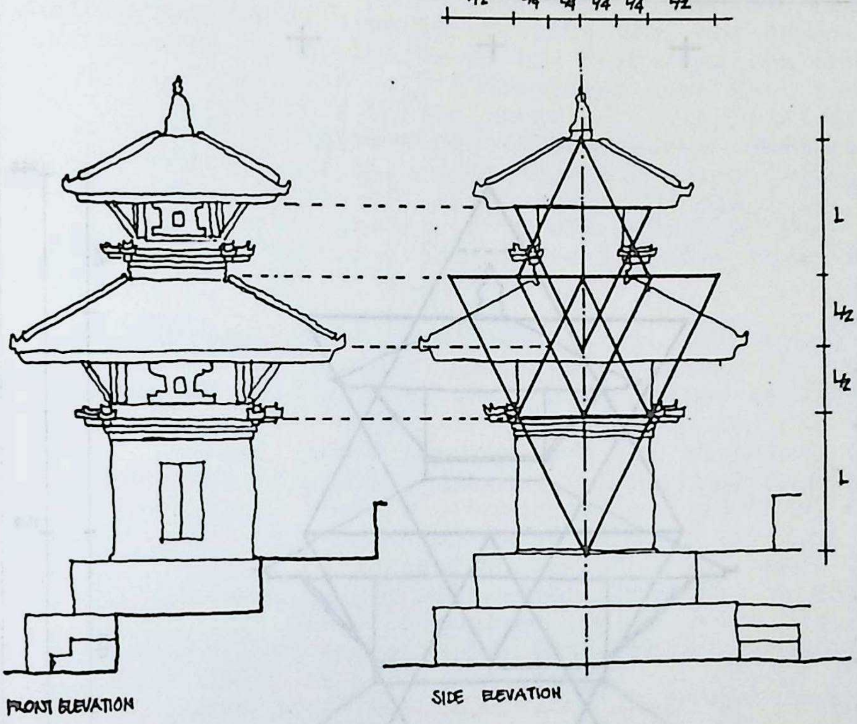
An examination of the relation of the god housed in any temple and the number of roofs of the temple suggest a strong need for a four tiered temple for Umamaheswor (Tiwari - 8), though in Bhadgaon Khauma Tole there is a one tiered temple dedicated to Umamaheswor. Of the two other four tiered temples existing in the valley now the Nala-Bhagbati is rectangular in plan and lower two roofs are proportioned on the basis of the grid lines perpendicular to long side and the upper two roofs are proportioned according to the grid lines perpendicular to the short side (Vinayasutras-grid line). The containing outer lines of the rectangle (Paryantasutras) and the cardinal axes through the centre (Pramanasutras) define the symmetry. This temple also has long side collonaded with five bays and the inner core wall parallel to the long side exhibits 3:5 ratio to the outer collonade. The other four tiered temple, the Harisiddhi temple, has all the Bhavanis as well as the Shankara dedicated inside. This is square in plan and the sanctum floor is on the first floor of the building. Some old folks in Kirtipur think of the multiple plinth of the Umamaheswor as a floor below the sanctum level. A closer study of the Harisiddhi temple can shed light on the original form of Umamaheswor. Cursory observation however indicate the use of 32 pada mandala in the design of this temple (32 is 2^5, see Tiwari - 8).

The Hindu precepts related to the proportion of plan and elevation can be found in many ancient scriptures. The temple type I and III as described in Matsyapurana appear of significance to Nepalese temples as it is known that the height of most Nepalese temples in the tiered style is 3y where y is a variant of the width of outer wall or collonade of the sanctum floor (x). The exact relation of y to x is controlled by the nature of division of the mandala. I have a copied manuscript outlining step for repairs/maintenance of temple which clearly shows the use of three proportioning triangles to arrive at elevation proportioning (Tiwari - M). A synthesized application of this principle to some existing temples show remarkable accuracy (Drawing no.3 - Narayana Dega). This particular


strut
baapa
Lhahka Lhahpa
Lhahphuah
simhamvah
nagposa
lotus petals
core wall

3.2 UMA-MAHESHOR. THE MISSING STRUT BANDS.

SRT


L/2
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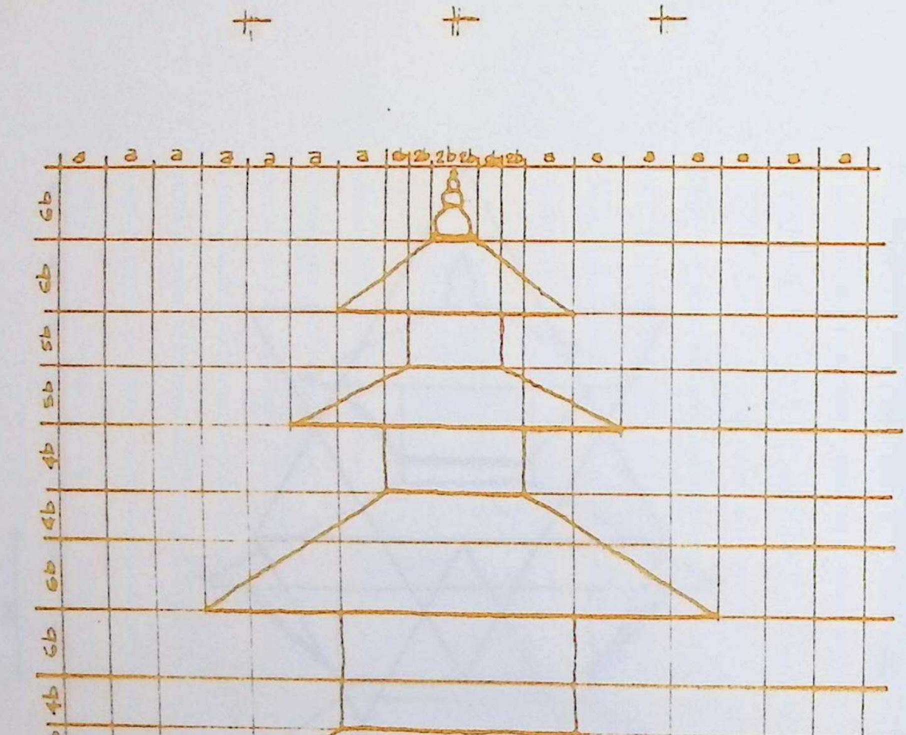
FRONT ELEVATION
SIDE ELEVATION
PLAN

3.3. PROPORTIONS OF NARAYAN DEGA, PATAN

BASE DRAWING FROM: W. KORN,
THE TRADITIONAL ARCHITECTURE OF KATHMANDU VALLEY.

SRJ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3.4.a. UMA-MAHESHOR - POSSIBLE ORIGINAL FORM

for mandala refer to ground plan.

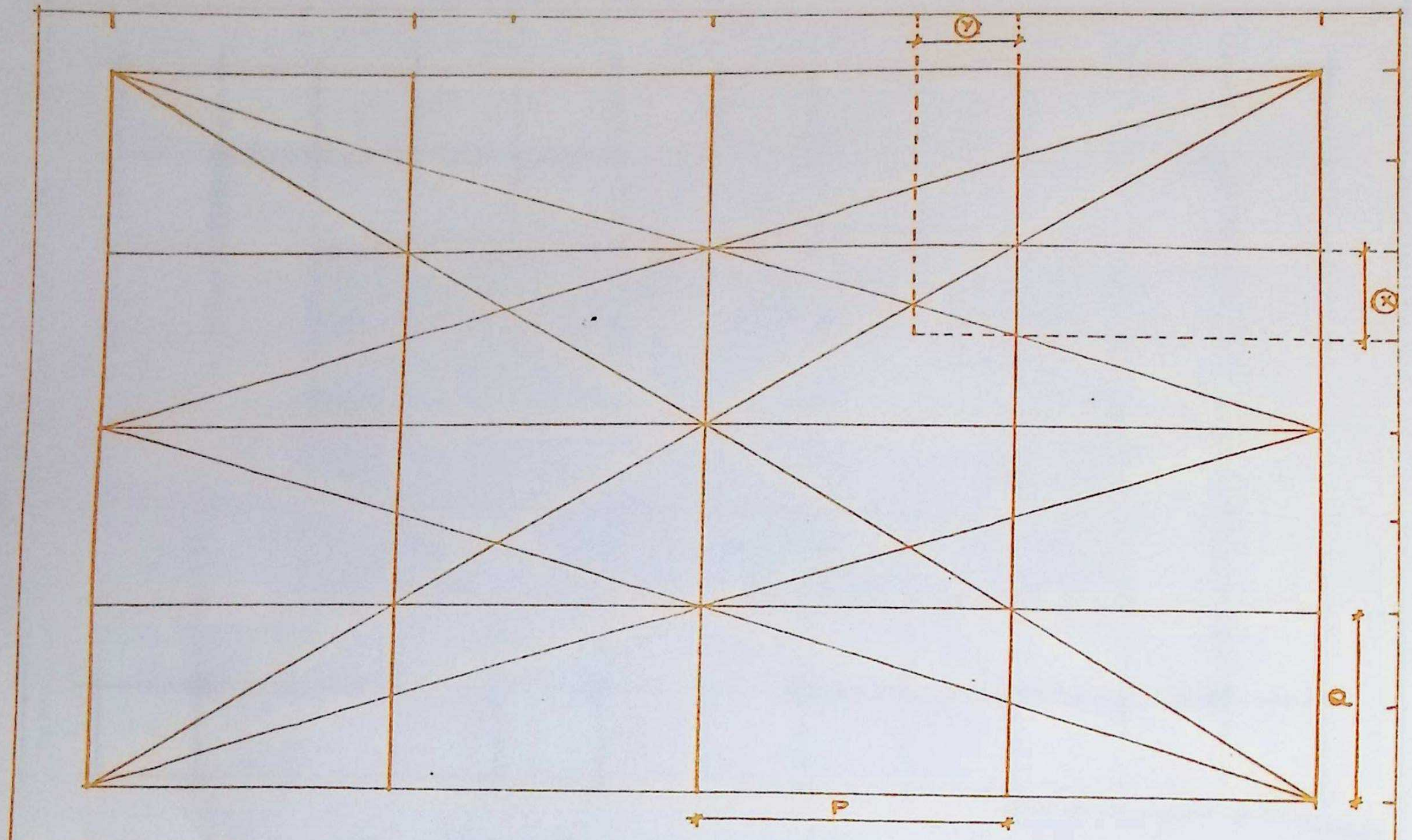
SAT

illustration competely follows the Matsyapurana dictate. Even the prasada (the cella) is an exact cube and the height of the roof structure is 2 times the width of the cella. The height of this porportioning triangle is however not universally equal to x. Study of other extant temples indicate that the ratio of height of the triangle to the length of the Paryantasutra can vary as 9:9, 8:9, 7:9 or 4:5 or 6:7 depending upon the plan mandala divisions. However the bottom inverted triangle always reaches upto the level of Lhahphvah. The samanya paddhati (simple principle) for the wall thickness of the sanctum floor, according to Matsyapurana 1/4 of the prasada width, is truthfully followed (i.e. wall thickness is one fourth of the length of Paryantasutra and the sanctum room is a square whose side is one half of the length of Paryantasutra).

The proportioning principle of Umamaheswor can be arrived at by imposing such triangles over the dimensions of the Umamaheswor temple (Drawing no.4). Only the lower portion is considered as the author is not certain of the authenticity of the upper structure. Because the Simhamvah band and Lhahphvah have been lost in the renovations the height of the proportioning triangle needs to be assumed. Therefore possible height of the triangle on the basis of various proportions such as 9:9. 8:9. 7:9, 6:7 and 4:5 (to width of temple) is computed and the most likely one chosen. As the usual height of element from the top of the column capital (metha) to top of Simhamvah is 1′3" to 1′9", except the first two ratios (9:9 and 8:9) all other ratios are ruled out as the indicated height of the triangle (i.e. 22′6", 20′, 17′6", 18′ and 19′3") would give less than 9" to introduce the Simhamvah band. I have concluded looking at the door details that the position of metha is correct and as such cannot be lowered. The first ratio gives 4′ space and the second ratio gives 1′6". The most likely height of the proportioning triangle is therefore 20′. This would mean that the height of the temple as it is now is less than the original by 8′0" at the base of the finial (gajur). This is most logical as it proportionately can equal to the missing top roof and four Simhamvah and accompanying design bands. Based on this triangle the possible elevation is shown in the illustration (Drawing no.4 overlay). The width of roofs in the projected elevation are based on the plan mandala. The levels of the elements are decided on the basis of triangle intersections.

BAGH VAIRAB TEMPLE

Located at the central saddle of the Kirtipur township, the Bagh Vairab temple site is possibly the oldest site in the hillock. Though it occupies a central place now, in earlier times it could have been the north east corner of the town, a location most suited to Siva according to ancient scriptures. Reference to Bagh Vairab as Gunde, Jhawa dya indicate its prelichchhavi importance but the reference to Bagh Vairab by its current name occurs



35a. VAIRAB YANTRA
$y = 1/3\,P$. $x = 1/2\,Q$. (after Silpa Prakasha.)

SRT.

almost along with the establishment of Kirtipur. It is not certain what sort of temple structure it had early on. The first restoration of the temple as recorded in inscription was done in the year 1515 AD. The temple should therefore date earlier than this.

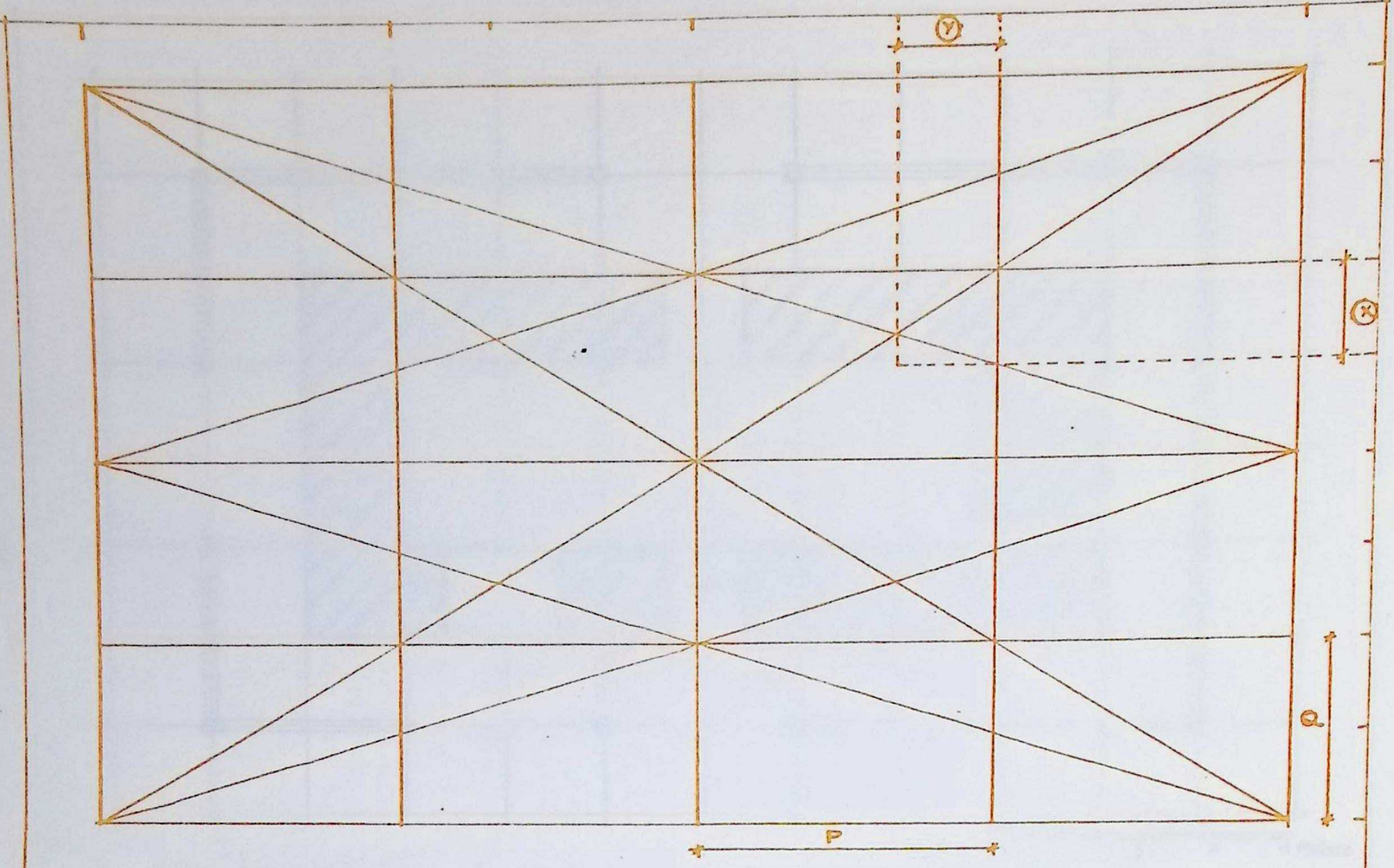
Form Of The Temple

The temple is rectangular in plan, which is typical for Vairab, Bhimsen and some Devi temples (Tiwari - 9). The current structure is certainly not basically changed since 1855 AD and probably true to the 1515 AD form. Though there are three roofs on the outside, there are four intermediate floors inside.

Ancient scriptures and the theoritical basis of Vastupurusa mandala tend to rule out rectangular temples in general.Only one temple major with rectangular sanctum has been observed in India -- the Vaital Deul of Bhubaneswor (ca 800 AD) -- possibly a Vairab temple also. However in the valley of Kathmandu almost all Vairab (one exception: Tika Vairab, Patan), Bhimsen (one exception: Hadigaon Bhimsensthan, Kathmandu) and some Devi (examples Bhubaneswori and Jayabagheswori Deupatan, Nala Bhagabati, Balkumari Patan etc.) tample are rectangular. It could be that temples with congregational worship pattern (Vairab) or housing gods with more human qualities (Bhimsen) or gods earlier resident in royal palaces (Balkumaris) were housed in temples built on the pattern of human residences. Many of these temples also show other peculiarities such as preponderance of gajurs (Bagh Vairab has 18 gajurs) on each roof, the location of the main sanctum floor in first floor (Bhimsensthan at Patan and Kathmandu and Vairabsthan at Bhadgaon) and also divider walls in ground floor (Patan Bhimsensthan and Bhadgaon Vairabsthan).

The relationship of the sides of the rectangle is not uniform. The Indian example has a 3 to 4 (short side to long side) ratio but such ratui is not evident in examples of Kathmandu. In Bagh Vairab temple these ratios appear to be 5:9 (collonade), 4:9 (core wall) and 3:9 (sanctum cella). According to Silpa-prakasha (Khanna) the Vairab yantra has a proportion of 6:9 and thus does corelate with Bagh Vairab.

Some striking geometrical relations are worth noting here. The three roof size (top, middle and bottom) are proportional to 4:5:6 and the three core wall (top, middle and collonade) display 3:4:5 proportionality. Because of this apparent geometry the possible mandala of Bagh Vairab is deduced as illustrated (Drawing no.5). As the relation of side of the length of the temple appear based on 9 divisions and the relation of roofs and cores are on 10 divisions, the minimum working measure (i.e. the long side divided by 90) for Bagh Vairab could well be five and two thirds inches (one "kuret" ?).



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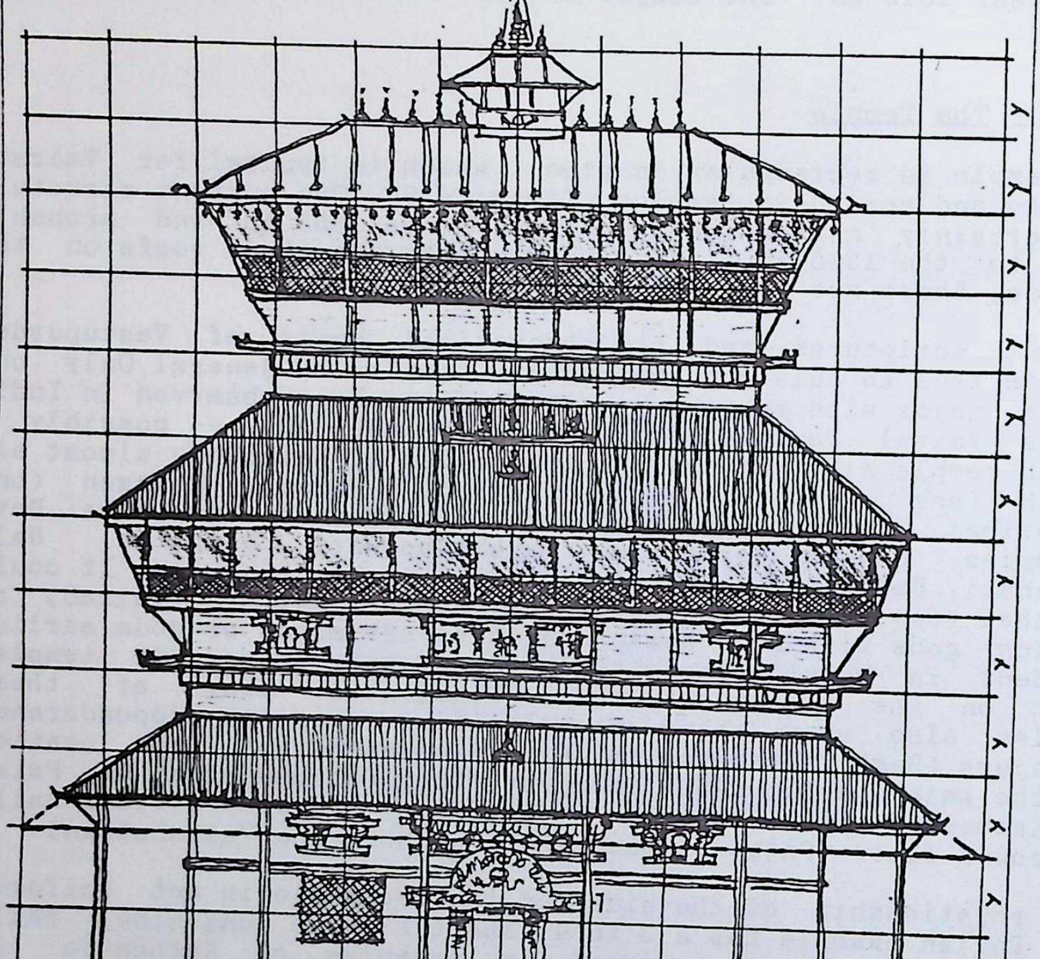

ELEVATIONAL PROPORTIONING OF BAGH VAIRAB. app. measurements

0 1 2 3 4 5 meters.

drg. 3.6

SRT

Though a complete measurement of Bagh Vairab was not available and I could take only a few height measurements from inside, it appeares that the internal floors are at 3a, 5a, 7a and 9a heights from ground level (a = one tenth of long side). Likewise the eaves beam of first roof, second roof and third roof are at heights of 2.5a, 6a and 10a, and the level of first and second Simhamvah and the total height are respectively 4a, 8a and 12a. It is my conclusion that the lowest roof has been reduced in size during renovations, consequently its current height is 2.5a The original height of the eaves from the design plane could well have been 2a (See Drawing Number 6. Possibly the proportioning triangle used for this temple had a base width equal to three fifths of the length and the height of the triangle was two fifths.

CONCLUSION

Of the three tiered temples of importance in Kirtipur, Bagh Vairab is possibly nearest to its original. Umamaheswor has been dwarfed and stripped of many elements. Its four tiered majesty has been replaced by a three roofed simplicity. The third tiered temple, the three storied Narayana Temple lives only on the memory of some old persons who were witnesses to Bhim Sumsher's "renovations". This renovation has changed the beautiful structure into an incongruent domical building. Fortunately the remaining truths themselves can be studied and the original truths can easily be deduced.

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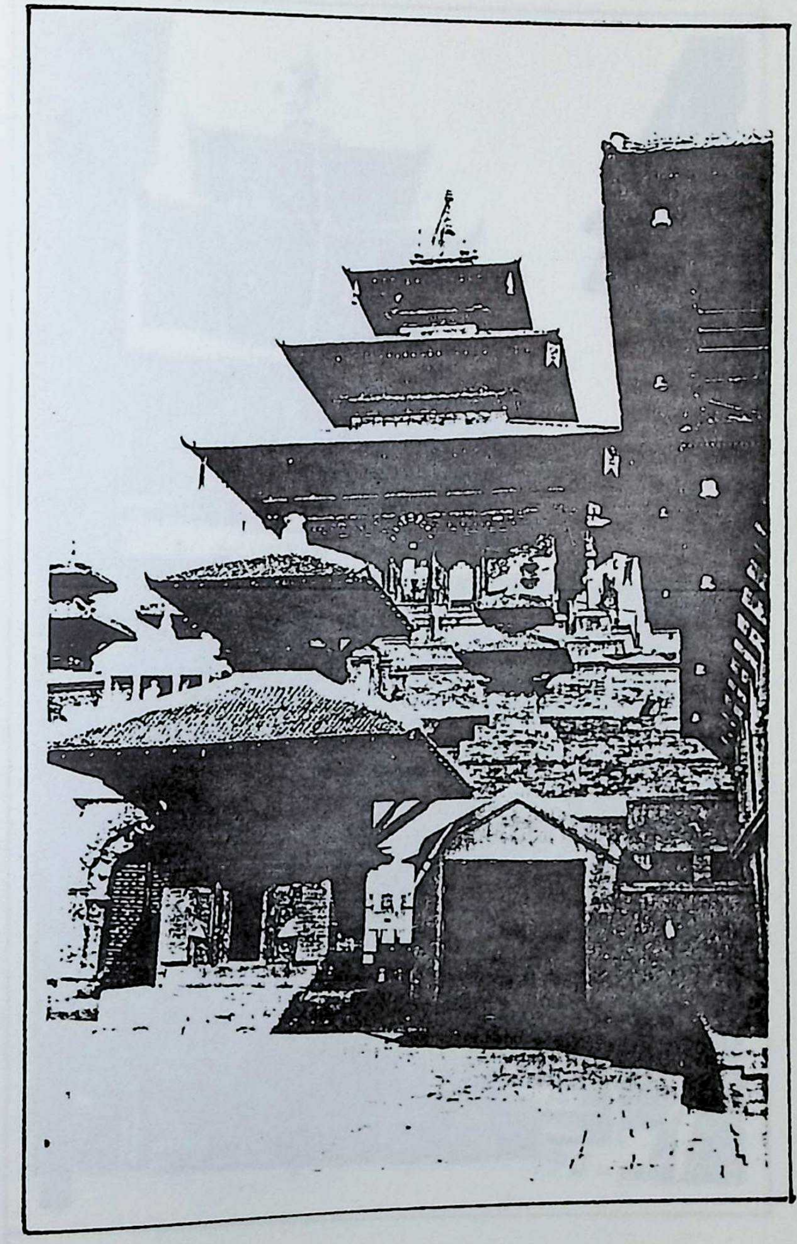
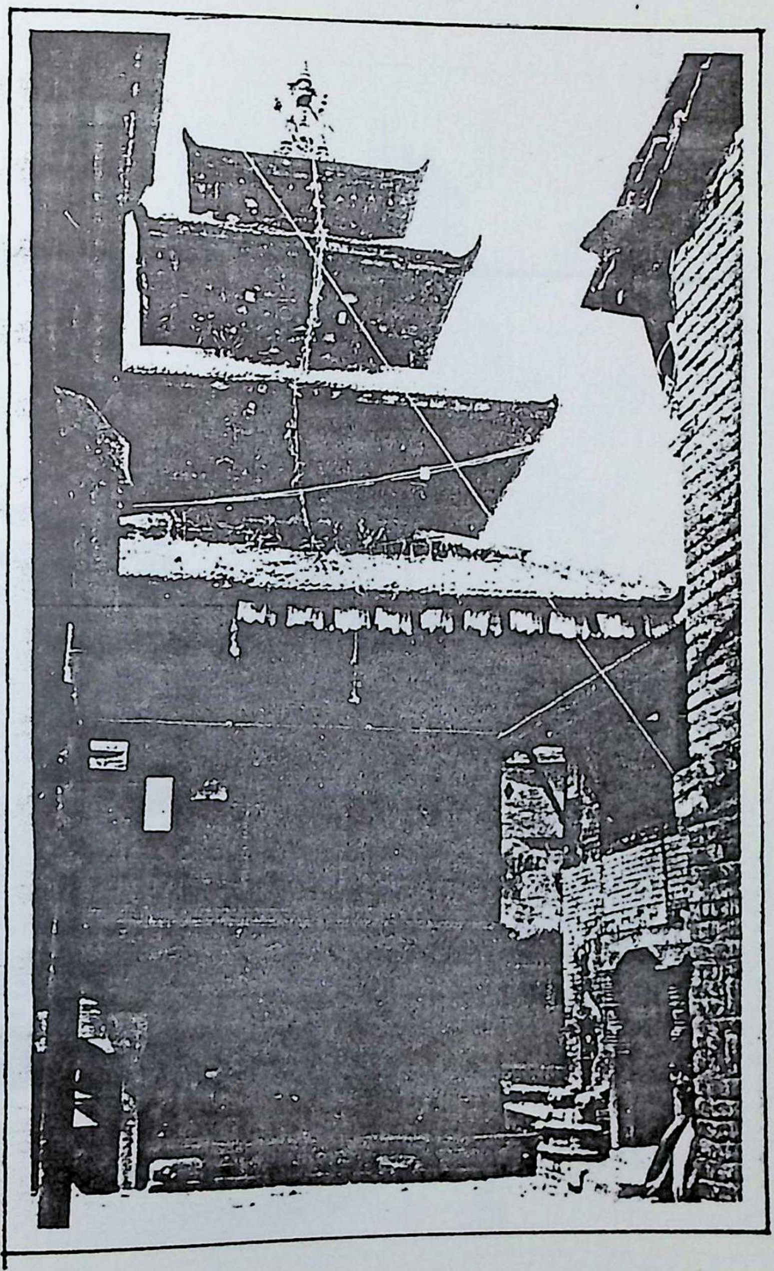
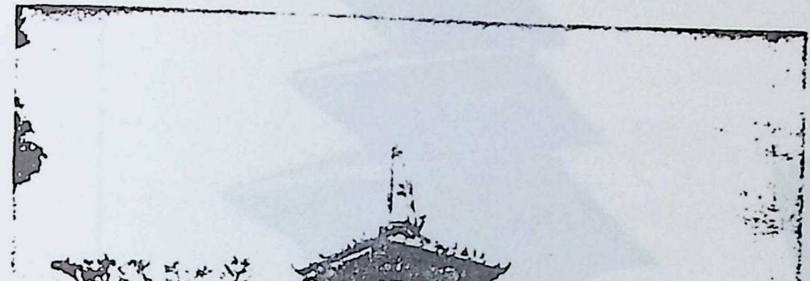


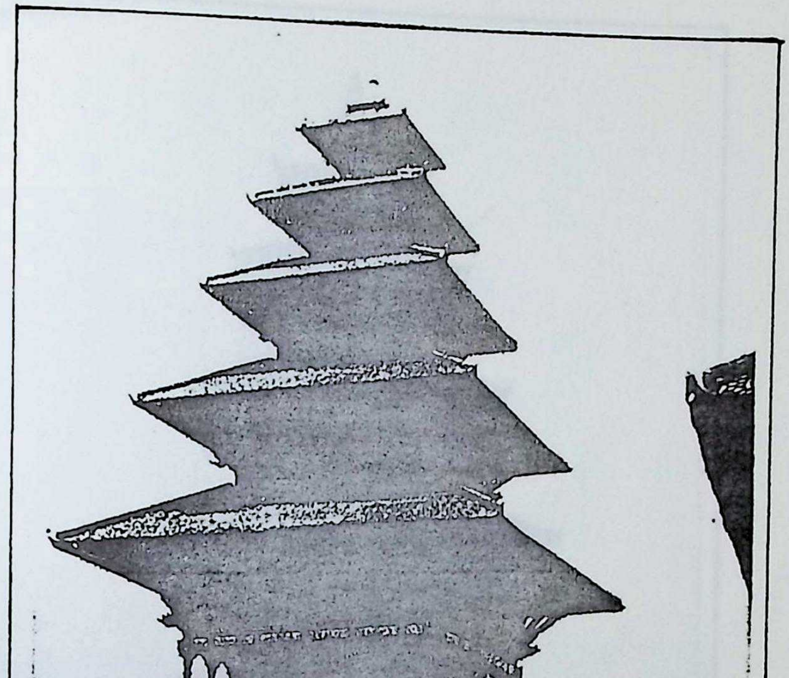
Taleju Temple, Kathmandu Durbar Square.



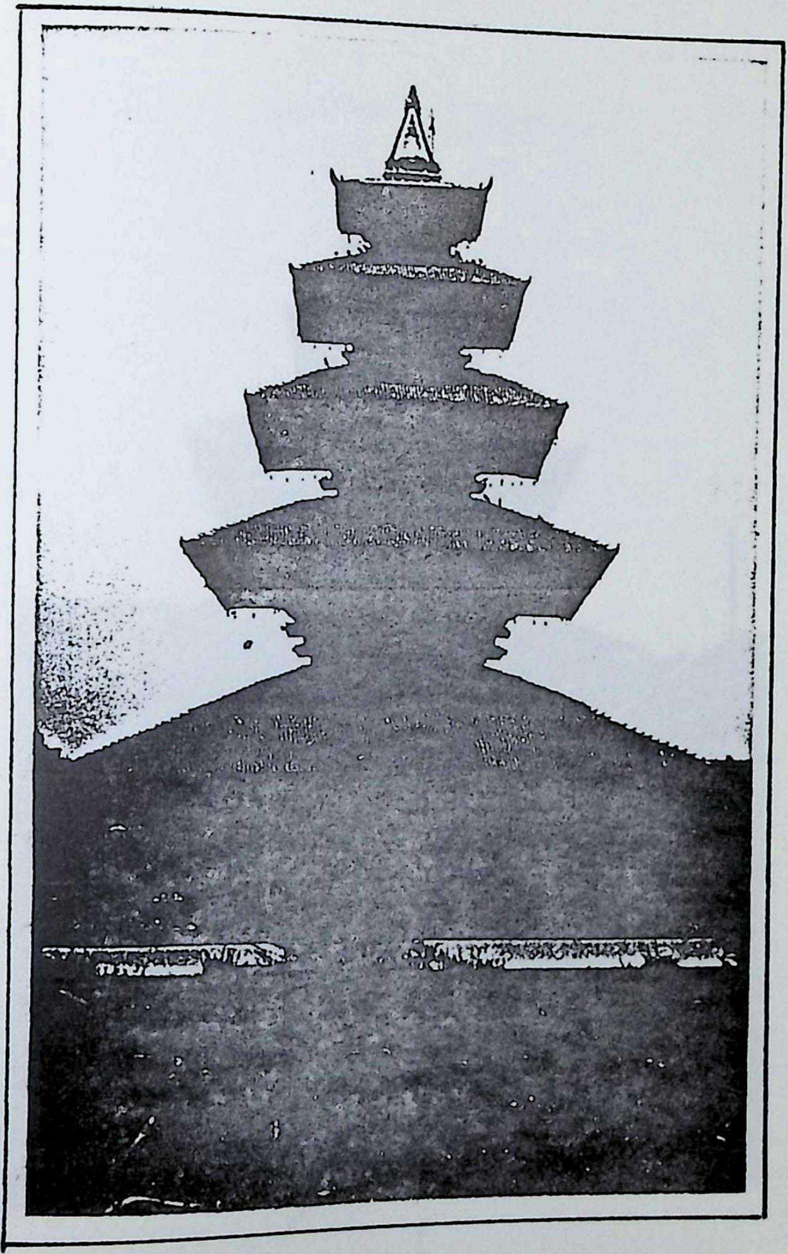
Harisiddhi Bhavani, Harisiddhi.



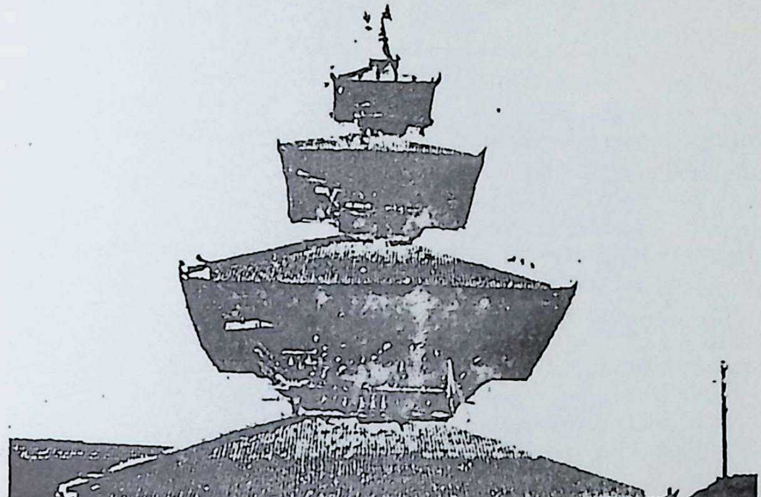
Jayabagheswori   Deupatan



Nyatapola, Bhaktapur Taumadhi.



Kumveswor, Lalitpur.



Nala Bhagabati

PART II: ENVIRONS.

CHAPTER I: THE URBAN SPACES OF THE MALLA TOWNS OF KATHMANDU VALLEY.

STREETS AND SQUARES :

THE URBAN SPACES OF THE MALLA TOWNS OF KATHMANDU VALLEY

INTRODUCTION

As architecture and urban space analysis developed primarily in the West during this century, every analytical term including urban space, street or square already carries within it western conceptual and definitive notions. As such they also convey cultural subjectivity of western civilization even as they define the physical, aesthetics and even functional characteristics. It would therefore be worthwhile to try to arrive at culturally minimal or neutra definitions of these words before proceeding further. 'All types of space between buildings in towns and other localities' (Krier) could be called urban space. Similarly streets could be defined as "linear spaces" which interlink pockets or spaces of distinct usage or social characteristics - the term linear space has been chosen so as not to reduce a street into just a transportation element. All urban spaces, which do not exhibit pronounced linear dimensions and are intersections, nodes or overflow spaces of streets are defined as squares. Both are public activity spaces, This paper will examine the nature of the Malla towns of Kathmandu Valley in terms of these elements, their concepts, variations and heirarchies.

Though movement is important in defining the nature of both the street and square, the speed of movement is essentially pedestrian in Malla urban spaces and squares differ from streets only in so far as a more leisurely pace and a temporary rest is indicated for squares. In the early Lichhavi days, when the pattern for the Malla townships were possibly laid, transportation corridors with faster than pedestrian pace were also in use cf. Hastimarga, Brihatmarga etc. but they do not appear to cross the town spaces. In the townships of Kathmandu streets gathered ceremonial specialization over time, the speed of movement being however the same, unlike the western urban scene where streets/roads with faster modes of travel came as an adjunct of development leading le Corbusier to his 7Vs classification.

HISTORICAL DEVELOPMENT

The urban form of the 'Malla Towns' of Kathmandu Valley is not a creation of the Malla period (12-18th Century A.D.) alone. These towns developed over a period spaning more than a thousand years. During this time though the ruline houses and their cultural, religious affiliations changed from Lichhavis (5-9th Century A.D.) to the Mallas and to Shaha (18th Century onwards) a cultural continuity was affected by the accomodative religious mix of Shivites, Vaisnavites, Buddhists and Shakti cults in the Newar community, the single ethnic group responsible for this urbanisation. Newars as an ethnic group had a strong communal life philosophy and this along with their system of the large extended family led to the development of the characteristic urban squares. Festivities were planned and performed to mark each and every perceived happening whether related to Gods and Heavens, Crops and Earth or Life, Death and journeys after. All these in effect created urban spaces suited to peculiar congregational activities.

To accurately interpret the intended appeal of these urban spaces, we need to look into their origins. Kailashkut Palace, the first palace complex of the Lichhavis sufficiently described by stone incriptions and corroborated by Chinese accounts, was built within a major settlement around 580 A.D. (Misra). Though Tang Annals indicate a grand palace, the absence of temple structures in this description should suggest that in those days central urban space of the palace square had no focal temple structure unlike in the Malla period later. However in later Lichhavi period there were many outlaying urban areas where the central urban square was occupied by a focal temple e.g. Bungmati, Sunakothi etc. Some of the inscriptions throw some light on the nature of streets prevalent at that time. One such street called "pratolya" was specifically meant for chariots. Others include Mahapatha (highway ?), Brihatmarga (wide road ?), Marga, Hastimarga (elephants' road ?), etc. Only Marga appears as an urban street.

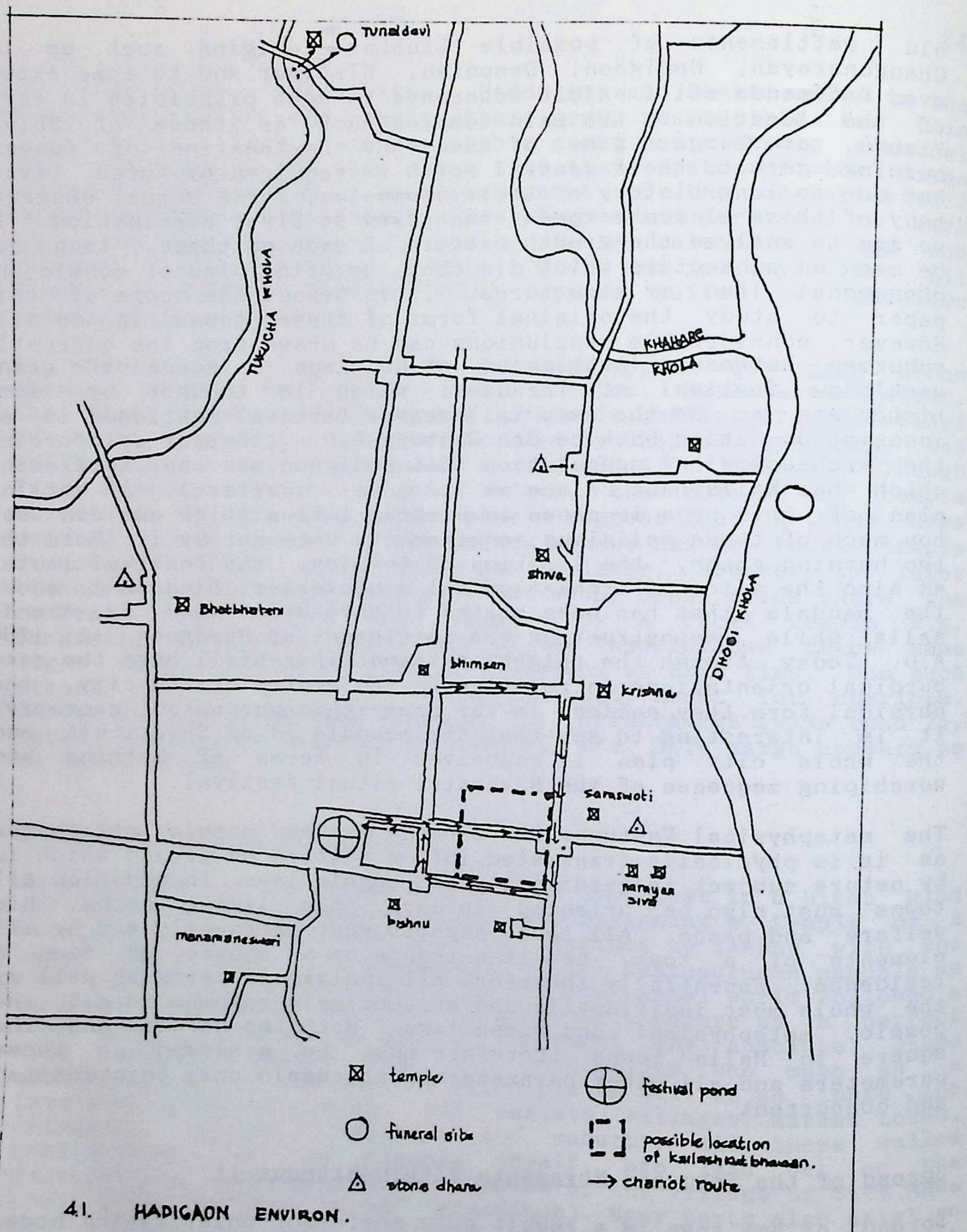
Religious Context of City Plan

Canonisation of forms has always been uppermost in a hindu mind and whether the priest-architect was designing a temple or a settlement it would have been sacrilegious to tamper with the basic cosmic form. The assumption of the Vastupurusha mandala as the form to bring about order in the phenomenal world followed a regorous religious exercise to hypothesis square as a perfect form able to contain as well as represent the Absolute. Since this square mandla with its cardinality was seen as a manifestation of the supreme principle as well as an image the laws governing the cosmos, all "hamlets, villages, market towns, citadels, cities, capitals and suburbs, all these walled habitations, as the Prasada itself, are laid out on the Vastupurusha Mandala, and the temples of the village or city have their place assigned on it" (Kramrisch). Many texts also exist on the subject of town planning, giving us details of street pattern, widths of these streets and also the residential quarters and their location. In essence however, all these require that the concept of the town be derived from a physical and/or a philosophical layout of a Vastupurusha mandala. The towns of Kathmandu Valley has been in habitation for such a long period that strict mandala patterns are no longer apparent. Many old settlements of possible Lichhavi origins such as the Changunarayan, Hadigaon, Deupatan, Kirtipur and to some extent even Kathmandu still exibit adherence to such principles in terms of the location o the main temples such as those of Shiva, Vishnu, or Durga. Some of them show the location of funeral burning gats to their general north as required by these texts. But due to long history of their expansion, for a casual observer many of these elements appear haphazard at first examination. If we are to analyse the growth pattern of each of these, towns can be seen as subsectors which did obey the principles of cosmic and phenomenal laws or structures. It is beyond the scope of this paper to study the original forms of these towns in detail. However, considerable conclusions can be drawn from the currently suburban Kathmandu settlement of Hadigaon a scene of grand weeklong festival of Torandevi which is thought by some historians to be the same Kailaseswor festival mentioned in an inscription dating back to 6th Century A.D. (thereby reinforcing the archaeological speculation that Hadigaon was the settlement which had Kailashkut Palace as its royal quarters). A outline plan of this area is shown in Diagram 1 from which one can see how much of these religious requirements were met by it. Note the two burning ghats, the location of temples, the festival routes as also the sites of archaeological discoveries. Diagram 2 shows the mandala that has been stated to have been used by Ananda Malla while reconstructing the settlement of Bhadgaon in 1260 A.D. Today though the (eight) Asthamatrikas still have the same cardinal orientations in relation to the centre of the city, the physical form they enclose is far from lthis purported geometry. It is interesting to see that the mandala is of Shakticult and the whole city plan is conceived in terms of bathing and worshiping sequence of the Navaratri ritual festival.

The metaphysical Vastupurusha mandala assumes cosmic attributes as it is physically translated into a pattern on ground which is by nature subject to cardinality and cosmic laws. In addition all towns must also be 'oriented' to jiva, the living being, his welfare and peace. All these aspects must be equally met by all elements of a town, be it a temple or a square or even a residence. Essentially therefore all individual parts as well as the whole must individually and collectively respond to all the cosmic, metaphysical and human laws. Both the street and the square in Malla towns therefore must be analysed in these parameters and all other parameters must remain only coincidental and concurrent.

Spread of the Town and Movements Within/Without It

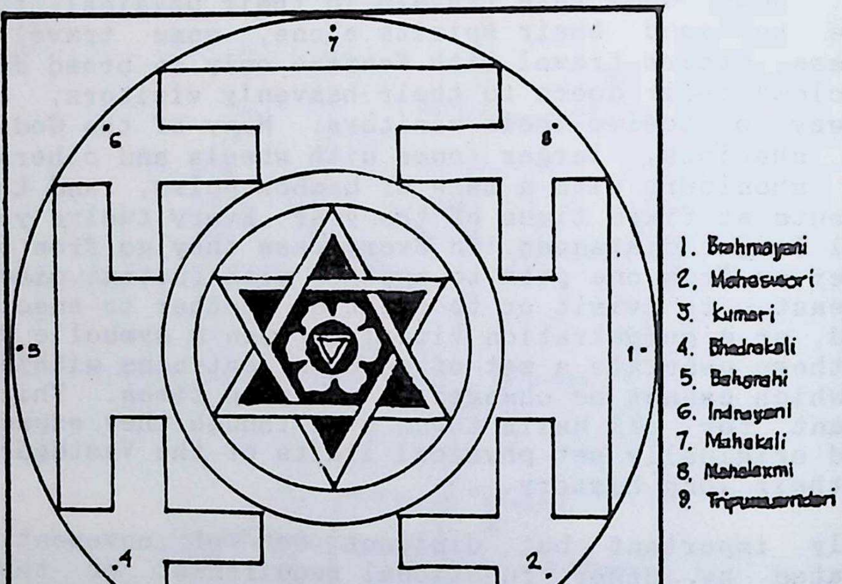
Spread of any town is a result of a series of polarization nodes distanced by space as well as time. The idea of any plan is to put up an ordered framework for these nodes so that at a given time or at a perceived future time, the town will be in 'order'. The nature of this order as perceived in Hindu thought discussed


Tunaldevi
TUKUCHA KHOLA
KHAHARE KHOLA
DHOBI KHOLA
shiva
Bhatbhateni
bhimsen
krishna
saraswoti
narayan
siva
bishnu
manamaneswori
temple
funeral site
stone dhara
festival pond
possible location of kailashkut bhawan.
→ chariot route
SRT

4.1. HADIGAON ENVIRON.

in the foregoing paragraph may be further extended to examine the nature of movements generated within or without a town. The metaphysical Vastupurusha mandala and the relations between the various gods accupying different sectors of this mandala (definite nodal points or spaces in a town) and the obeyance of cosmic perceptions and laws by the Gods also generate a series of Godly movements in the city at specific times of cosmological conditioning. In Malla towns of Kathmandu Gods not only take residence in different places at different times of the year, they also visit other Gods and temples to live out legends or heavenly obligations as it were. The daughters visit their mothers or the arch enemies fight over areas for supremacy, others in some particular cosmic conditions just come together to feast. Some Gods take travels in their physical forms, others choose to send their spirits alone, some travel quietly in darkness, others travel with fanfare only in broad daylight. Some Gods close their doors to their heavenly visitors, others come a long way to receive their visitors. Many of the Gods came out in their chariots, larger ones with wheels and others carried on human shoulders with a maze of bamboo poles, and they travel a set route at fixed times of the year. Every twelve years they may travel longer distances. In every case they go from one temple to another or from one pith to another pith (potent site) - whether to feast, to visit or to fight or whether to enact a creation legend, or a perpetration ritual or even a symbolic death scene - all these generate a set of movement patterns within or about a town which cannot be changed by changing times. This has been a constant for all Malla towns even though they expanded greatly beyond originally set physical limits of the Vastupurusha mandala over their long history.

Equally important but distinct set of movement pattern is generated by other functional requirement of the city i.e. responding to the welfare and peace of the living being, the jiva. As the concept of welfare of the living being is strongly tied with welfare in lives following death in the present life (soul and rebirth philosophy), and death and rituals accompanying it, movements both in life and in death act as important generators of planning determinants (Herdick). The living and their routine movements primarily include performing daily religious rituals such as bathing i the rivers or sacred ponds, offering daily pujas to various Gods to set the tone of the day, going to the farms and coming back, going to the market to buy/exchange items of mundane necessities and the like. These generate patterns linking rivers, ponds, temples, farms and markets to the residences. Indeed almost all Malla towns were sited on non-agricultural ridges along various rivers primarily to meet such requirements. Many of the Gods were housed along these very rivers so as to keep the purity after ritual baths fresh. The towns had farm lands all round the settlement and across the rivers causing the growth of radial streets to rivers and farms - two or more of these streets would then join together as they reach into the towns - such nodal points developed into


7
6
8
5
1
4
2
3
1. Brahmayani
2. Mahesvori
3. Kumari
4. Bhadrakali
5. Baharahi
6. Indrayani
7. Mahakali
8. Mahalaxmi
9. Tripurasundari
SRT

4.2. MANDALA of the city of BHAKTAPUR.

squares with increasing social importance as they got closer to the city center. All such streets would ultimately converage in the Durbar square, the central palace nodal point, where all social activities also converged. The Dead and their first travel away from the present world however were conceived as the exact reverse of hese living heirarchies. The funeral routes, always never going along the outes taken by wheeled chariots of Gods, never going over bridges and only in physically impossible contexts taking the route of the lesser Godly festivals, generated the still narrower backlanes, service streets as it were. These funeral routes had only two nodal points - the first stop bing the point where one breathed last and the second the funeral ground itself where one would be consigned to nature in flames. Both the funeral ghats located along the river at either one end of the settlement and th funeral route, avoid the temples as no Gods would welcome the mourners for the next thirteen days. By then the soul would have completed its journey to the world of the dead and living pattern will again slowly come into force.

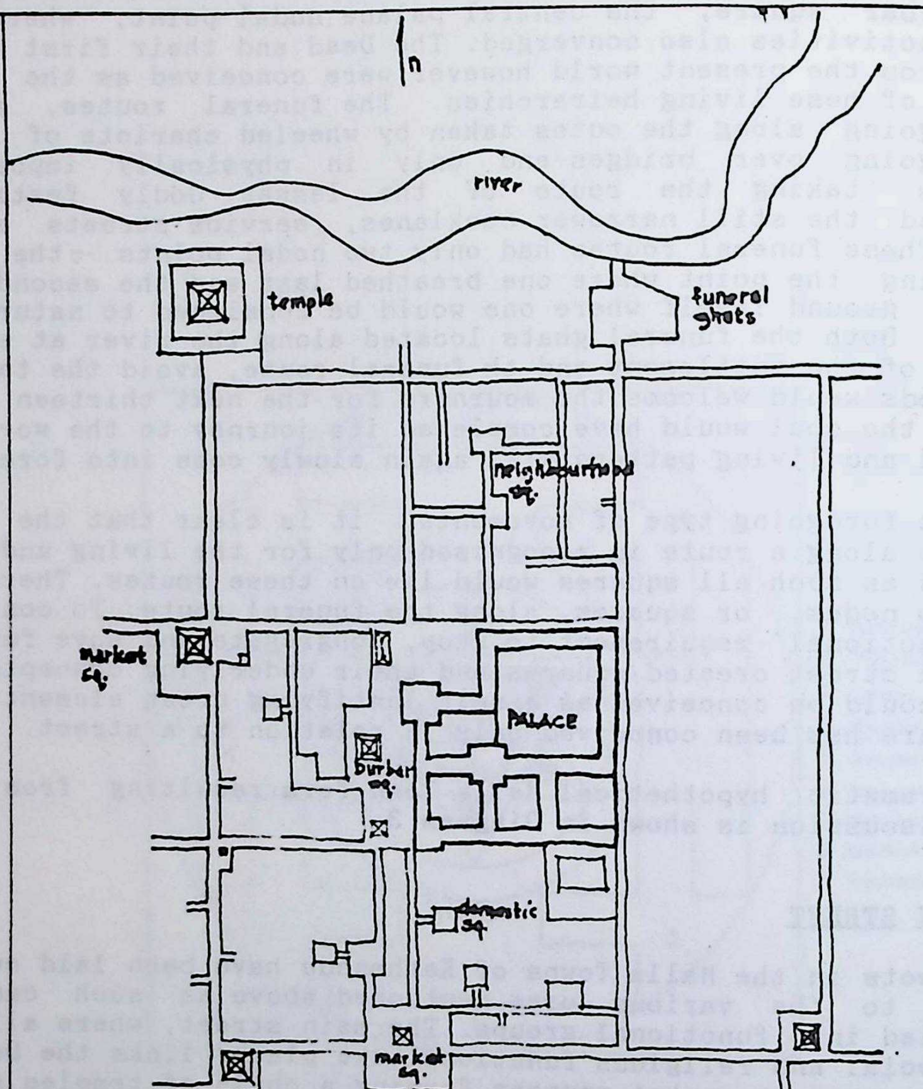
From the foregoing type of movements, it is clear that the need to stop along a route is recognised only for the living and the Gods and as such all squares would lie on these routes. There are to be no nodes, or squares, along the funeral route. To conclude the 'functional' requirement to stop, congregate and move further along a street created squares and their underlying concepts. A street could be conceived as a self justifying urban element but the square has been conceived only in relation to a street.

A diagramatic hypothetical Malla Town form resulting from the above discussion is shown in **Diagram 3.**

THE MAIN STREET

The streets in the Malla Towns of Kathmandu have been laid out to respond to the various uses mentioned above as such can be classified into functional groups. The main street, where all the major social and religious functions take place, links the Durbar square to various market squares forming a chain of temples along the way. The secondary streets link the market squares with neighbourhood squares going further on to meet some temple along the river on the edge of the town or some other potent spaces. Some of these streets would continue on to the farmlands in the open. The lesser streets going on to the farms originate from all residential areas if the main and secondary streets are not serving this purpose. Many of these lesser streets and the funeral alleys form the network of service streets behind the festive streets of the town. However, it is the main street which embodies all the urban space concepts of a Malla street, intended as well as coincidental.

The main street derives its basic character from the fact that it is effectively a long chain of straight line segments, each


n
river
temple
funeral ghats
neighbourhood sq.
market sq.
PALACE
durbar sq.
domestic sq.
market sq.

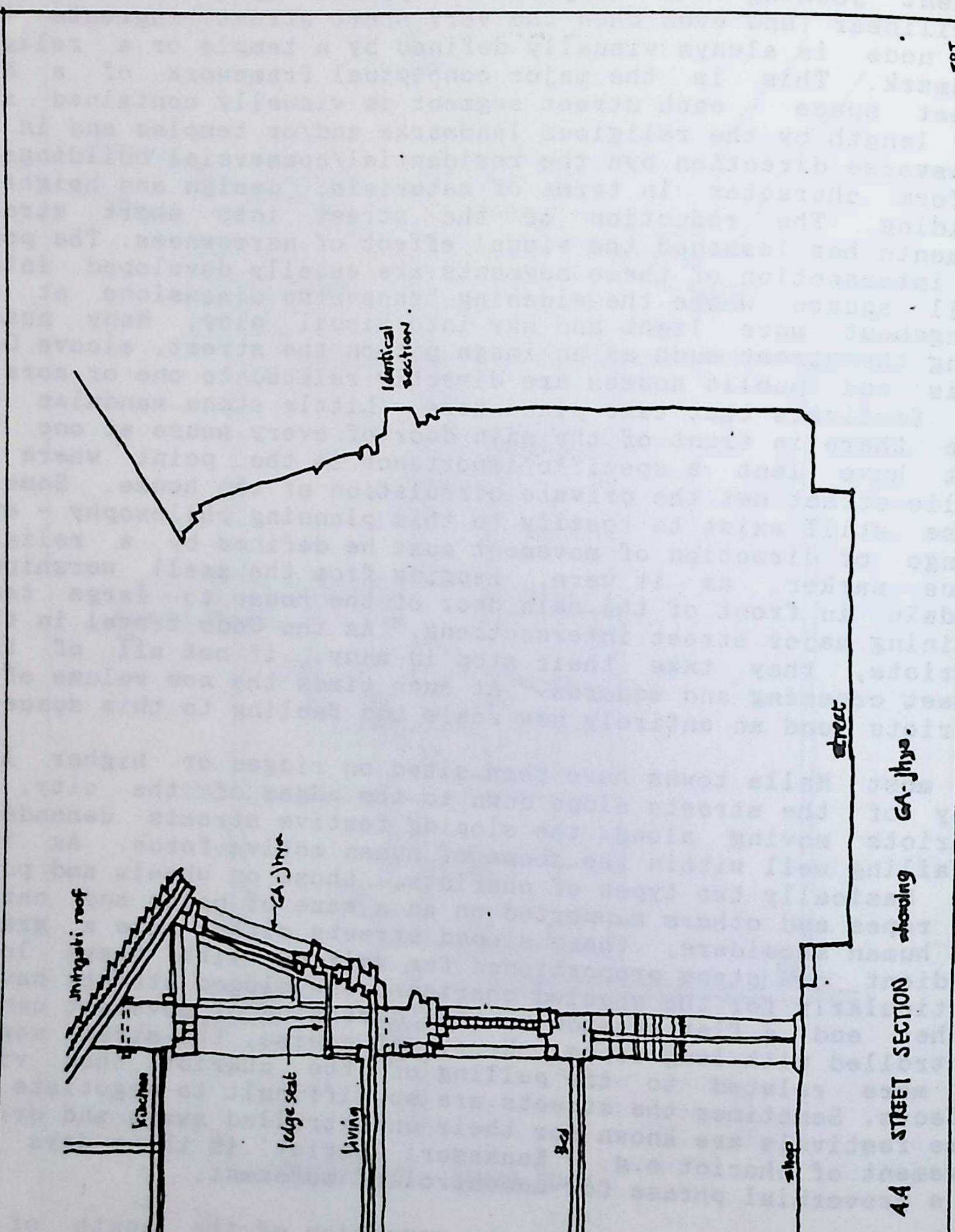
4.3 DIAGRAMATIC MALLA TOWN.

SRQ

segment joining two temples or potent spaces. No line is curvilinear and even when the very short street segments turn, the node is always visually defined by a temple or a religious landmark. This is the major conceptual framework of a Malla street space - each street segment is visually contained along its length by the religious landmarks and/or temples and in the transverse direction byn the residential/commercial buildings of uniform character in terms of materials, design and height of building. The reduction of the street into short straight segments has lessened the visual effect of narrowness. The points of intersection of these segments are usually developed into a small square where the widening transverse dimensions at once bringabout more light and sky into visual play. Many nuances along the street such as an image pit on the street, alcove Gods, Patis and public houses are directly related to one or more of the festivals that take place here. Little stone mandalas that were there in front of the main door of every house at one time must have lent a specific importance to the point where the public street met the private circulation of the house. Some of these still exist to testify to this planning philosophy - every change of direction of movement must be defined by a religious place marker, as it were, ranging from the small worshipping mandala in front of the main door of the house to large temple defining major street intersections. As the Gods travel in their chariots, they take their stop in many, if not all of these street crossing and squares. At such times the new volume of the chariots lend an entirely new scale and feeling to this space.

As most Malla towns have been sited on ridges or higher lands many of the streets slope down to the edges of the city. The chariots moving along the sloping festive streets demanded a detailing well within the scope of human motive force. As there are basically two types of chariots, those on wheels and pulled by ropes and others supported on an a maze of poles and carried on human shoulders, these sloped streets either have a gradual gradient or steps proportioned for walking with heavy loads. Particularly for the wheeled chariots, the sloped streets have at either end a flat stretch so that direction of movement can be controlled with long ropes. Here, of course, the street segment is more related to the pulling of the chariot than visual effects. Sometimes the streets are so difficult to negotiate that some festivals are known for their uncontrolled sways and erratic movement of chariot e.g. 'Kankesori Chariot' is these days used as a proverbial phrase for uncontrolled movement.

With objectives similar to the reduction of the length of the street into visually managable sections, the bounding surfaces on the sides of these streets have been designed and treated for visual harmony. These bounding elevations essentially consist of a chain of repeated elevations and an uniform building section. The ground floor either consist of shops or small carved doors, the first floors have a series of odd number of carved windows similar in opening span to the ground floor door and the top



4.4 STREET SECTION

SRT.
Identical section
Jhingati roof
GA-Jhya
kitchen
ledge seat
living
Bed
shop
shading
street
GA-Jhya.

floor consist of large carved windows often sloping up and out to meet the projecting roof. It is this top window known as the GA-jhya which lends an air of prosperity and marvel to the street. Its design is not only just to the narrow width of the street but also reinforces the concept of the street as a linear activity space wherein visual participation of the residents becomes a functional requirement. The Diagram 4 illustrates how these windows facilitate observance of public activity space from the privacy of the room at the same time protecting this privacy by cutting off the public view. The diagram also illustrates how the "narrowness" of the street is visually perfect with the inclination of the GA-jhya and how a wider street could not be visually effective for participatory activities. It is of course clear that a Newar architect was not aiming for more sun or sky area but as much field of vision of street area as possible - thus the inclination.

THE MAIN SQUARES

The Malla Towns show a distinct set of squares with a clear heirarchy of social cultural activity. These are the Durbar square or the Central Palace Square, the Market Square, the Residential Neighbourhood square and the Private Residential square. Though the last listed one, the Private Residential square is almost a large courtyard house designed for communal life style of an extended family and can be conceived of as an autonuous space largely independed of the street space the rest of the three squares are dependent on the street for their visual and spatial appeal. As shown in the Conceptual Town Diagram these suqare are laid out a nodal points or spaces where street directions change and two or more streets lead in or out of it and are always marked by some temple or religious landmark of other nature of sometimes just a stone water conduit.

The square of the first order is a simple rectangle or a square defined by bounding elevations similar in characteristics to the main street facade of row buildings. The geometry of elevations of all the four surfaces shows heavy ground floor, smooth first floor and a light second floor. Often two opposite sides are detailed in similar tones giving a orientation to the square, further reinforced sometimes through the main gate detail or the family deity room in the middle section of the ground floor. This space is completely bounded, the entry being taken through a passage on the ground floor of the building side along the street. Some of these squares may also have a votive miniature temple or a well but no trees or grass areas. The aged brick and wood elevation and the character of paving material such as brick or stone set the colour and tone of appeal.

The square of the second order, the Residential Neighbourhood Square, houses a large number of extended families, often belonging to, the same clan group. Apart from the size of the square, it differs from the Private Residential Square visually as more than two streets come to meet this space. So many variations in the intersection of square and the street are tried that each squares derives a different visual appeal. (For details of theoritical possibilities see Krier). This square shows nodal properties of the basic order and also houses some public religious edifices such as a temple or a large water spout. The ensueing sociocultural activities bring in larger congregation at time and some such squares have also attained national importance (city nation of the Mallas) e.g. Itum Bahal square. Being basically residential, the temple volumes do not dominate these squares and the element of surprize associated with the changing visual axis is barely there. Sometimes the larger of these squares do not even form an enclosed space basically as he height and treatment of bounding elevations retain the scale and configuration of the square of the first order.

The square of the third order, the Market Square, is remarkable for its heightened urban space sense and has many elements of urban interest. Though some of these Market Squares may be smaller than some of the second order squares, they play a great role in the sociocultural scene of the town. Still others of these squares have attained such importance by virtue of the main temple in the square that even the Durbar square is culturally dominated (cf. the Nyatapola square in Bhaktapur and the Bhaktapur Durbar Square). The market square is the archetypal nodal square located at a street intersection. As each street coming into the square needed a visual focus, each square would usually have more than one element of visual focus. The visual effects associated with entering widened space while moving along a narrow street attain new dimensions as newer foci indicate new directions of movements possible. Sometimes these foci are located in such a way that the most dominating element is the last one to be seen as one enters the square. The Nyatapola square, its plan and visuals amply explain the resultant visual surprizes awaiting a pedestrian as he enters the square from different directions i.e. with different purposes. Also the bounding elevations recede in the background as the dominating temple structure with its expanding and contracting volumes (positive and negative volumes) is sited in the square. The tiered temples, their particular form and their elevational and sectional properties have no parallels in the West. As these temples are sited as sculptures in space, they exhibit characteristics of space-radiating volumes situated in open space bounded by the standard commercial residential building facade combinations (cf. S. Giedion´s conceptual classification of architectural styles). The changing axes of movement and visual arrest affected through careful siting of foci and their aesthetic and volumetric contrast with the bounding surface combine to reinforce this element of surprize.

The functional aspect of exchanging produces was met through constructing low platforms within the square and these were located within the square so as to streamline the lines of movements within the square. But the market square comes to life with cultural activities rather than with commercial activities. Some of these activities are so enthusiastically participated in by the residents of the town that these space overspill. Religious and cultural legends and stories are passed on from generation to generation and this has virtually ensured the continuance of its cultural function even in these days of western influences and material hardship. However, this square because of the residential usages in the bounding maintain a lined in feeling even when no marketing or cultural activities of the periodic nature are taking place.

The Durbar square, the apex square in the heirarchy of open spaces, is the central urban area where the palace is located. This is also the space where all the streets lead to, whether as independent routes or as feeders to the main street. The main street crosses it along its length with the palace on one side and the temples on the other. Indeed all the major God and temples of the city are represented here and have their temples located along this space. Some Gods of national importance will be located only here and if the main temple of other Gods of national significance are located in the market squares or on the outskirts they are represented by replica structures similar in concept and detailing to the original one. As a result of the number of developmental phases or its length of history the Kathmandu Durbar Square appears organic and has some very complex spaces, the Patan Durbar Square appear very formal and geometric, while the Bhaktapur Durbar Square appears segmented. Each of these space variations can be explained through chronological studies and the waxing and waving power play of the associated palace.

The Palace itself is a strong determinant of this space. It is a building with a series of internal paved courtyards built to cater to various functions of the palace including the main royal residence and courts (Rajakul), the royal shrine (Debkul), conference (Savagriha), bath (Snangriha), inner court (Antapur), pregnant womens quarters (Aristagriha), dining areas (Aharmandap), cooking areas (Bhansaghar) etc. One court led to another thus securing the palace. At one time the Hanumandhoka Royal Palace had as many as 35 courtyards. Inside the palace complex itself various temples were built specifically for royal use. In the Hanumandhoka Durbar as many as seven such temples exist even now in its ten courtyards. The positive volumes of the palace buildings and temples and their positive and negative volumes create an air of grandeur. In most of the residential courts the palace do not exceed the height of the rest of the city (excepting Loh Chauk of Hanumandhoka palace and its tall towers) and are very much human in scale. The aspects that distinguish the royal palace from the other residences of the city are the spread of the palace in its many courtyards, mass of facade woodwork carvings and its internal temples often located on top of the residential quarters.

The sculptural quality of the large number of the temples interspersed along the main street, their uniform aesthetic and volumetric characteristics and their repetition create a light and etherial visual impact. Against the contrasting backdrop of the solid lower floors of the royal palace and similar temple volumes on top of the palace, an urban poetry in geometry of volumes of architectural excellence is created by these temples. Like in the market square, the changing focal temples as one moves along the main street and the interspersed open spaces exhibit similar elements of surprize and optical interplay. The selection of slides of the Hanumandhoka area will exemplify this. Again as in the case of Market Square, the festivals with the Gods wih or without their chariots bring life to the whole space. By royal decree all festivities either start, pass through or culminate in this Durbar Square. In many of these festivities, the new volumes of chariots (either in Tiered form or in Shikhara idiom) add special dimensions to the space. The Durbar Square is a space where movement of the onlooker is required to feel its full import. The essence of the space lies therefore in its changing combinations of temples and bounding elevations even after entering the square. The Patan Durbar Square is an excellent example where the judicious placing of similar volumes generate a variety of sequential impact. Though the demarkation of the public spaces and temples and the royal space is literally done by interposing the short length of main street between the two and the whole area is very compact, the effect is not as literal.

CONCLUSION

The total urban form of Malla Towns can be summarised as a combination of two forms, the house form and the temple forms, tied up in a coherent visual order through the use of streets and squares. Both the forms use the same materials and external architectural finishes but arrive at different forms because of conceptual differences in volumes and technologies. The residential form is solid and whereas the temple form with its expanding and contracting (positive and negative) volumes is very light in impact. The placing of these forms in a variety of combinations along the street or in the cubic space of a square have created an endless series of geometric spaces with exciting foci.

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PART II: ENVIRONS.

CHAPTER II: PASHUPATI KSETRA AND THE ENVIRONMENT.

PASHUPATI KSETRA AND THE ENVIRONMENT

वनोपान्तनदीशैलनिर्झरोपान्तभूमिषु ।
रमन्ते देवता नित्यं पुरेषुद्यानवत्सुच ॥ (वृहतसंहिता, ५५.८)

The environment of the Pashupati area must of necessity be considered in a spiritual plain as the area is not only a temple ´site´ but also a ´ksetra´. Its potency as a ksetra is many fold. The presence of Siva (the self evolved jyotirlinga) and the ´Sakti´ (the pitha Guheswari) are its two important divine attributes. The potency of the area is a spiritual concept and its desired physical attributes are well told by the above verse from the Brihatsamhita:

> "The Gods always play where forests are near and
> also near river, mountains and springs.
> And also in towns with gardens". [1]

Seers have also said that Gods play to the rhythm of the song of birds in areas sanctified by resting animals under the trees, along the river banks. Gods dwell in environments with the integral elements of mountains, forest, water, sound of birds, and quietitude of resting animals.

It would therefore be necessary to view the environmental degradation of the Pashupati Ksetra in these very physical parameters and the actions needed to revert back to a compatible environment also should follow on these very considerations.

The elemental mountain and the forest

Pashupatinath Temple sits on the Southern base of a ridge cut through by the river Bagmati. ´Kailash´ is this mountain which also had to serve the spiritual purpose of grazing ground for the Basaha, the bull. The current built environment is fairly satisfactorily intergrated with the mountain and the forest to the east of the river Bagmati. The physical relationship of the Kailash with the temple presinct and its bull however leave much to be desired. Indeed this link has more or less been cut off by the nature of the built environment and now the Kailash shows itself as a seperate entity. The link to Kailash through the buildings north of Vashuki Temple has almost vanished, along with this linkage of the temple presinct with important Lichchhavi sites is also in a dying process. The Mrigasthali environment remains fairly true to the ordained spirit.

Actions are needed to open and improve these linkages. First interventions are suggested near Vashuki Temple and the pathway existing to the west of the maingate of the temple court. These actions should include creating grassland as well as planting trees. The barren look of the Kailash itself cries for plantations so that the grazing animals may have some shade - so essential to bring back the quietitude it must have once possessed.

The elemental water

The ornamental water, the river Bagmati, still flows. However its water level has been greatly affected by siltation, resulting both from the construction of the irrigation barrage on the south and the removal of sand for construction purposes in other areas. The water itself is muddy for this reason also. The general pollution level is quite high. Aside from the health consideration of the devouts taking the holy dip, it is also necessary to improve its water quality from the consideration of aquatic animals such as swans and carp, so essential for the life of the river. A minimum amount of flow must be assured along with maintaining a satisfactory water level at all times of the year. As the seers have said:

> "The Gods always play where rivers have for their bracelets the sounds of the flight of curlews and the voice of swans for their speech, water as their garment, carp for their zones, the flowering trees on their banks as their earrings, the confluence as their hips, raised sand banks as their breasts and the plumage of swans their mantle." [2]

A fully potent river would be such and our efforts should be to get as close to this as possible in the current context.

Pollution control measures should be initiated a mile or two before the river Bagmati enters the Pashupati ksetra, and these controls should also try to stop muddying activities within the control area. The removal of sand should be allowed from the technically advisable areas only. Desilting activities should be undertaken. Planting of trees on the river bank north of Guheswori and near the Tribikrama area is very much needed. Allowing swans and carp to populate the river waters will significantly improve the environment and also highten its spiritual potency.

THE ELEMENTAL SOUND

The sonic environment resulting from the free flow of water through boulders or waterfalls along with the sounds of the flight and voices of swans, curlews, ducks and pigeons was the most desired one for the enjoyment of the Gods. The Nepalese builders have also used the blissful qualities of tingling bells tuned to varying windspeeds of dawn, day and dusk to give a sonic backdrop to the pilgrim.[3] In the ksetra, the Pasupatinath Temple court area needs intervention to improve its sonic environment and the area east of the river Bagmati is quite satisfactory even now.

As quite a population of pigeons exist in the general area and as we take steps to improve the Bagmati river through allowing swans and ducks to settle, we would have met the basic sonic environmental requirement. During earlier renovations the tonal qualities and the weight of the bell leaves have been compromised without thought of their purpose and these need to be restored. Then the bells shall toll to the time of the winds of the dawn, day and dusk once again to soothe the pilgrim.

With these actions the environment can be restored to its original content and we can expect the God to always dwell in the Pashupati Ksetra. It can then remain a Tirtha for eons to come.

NOTES AND REFERENCES

[1] , [2] As translated by Kramrisch, S. The Hindu Temple, Calcutta. Page 1 - 4.

[3] Sayami, D. The Lotus and the Flame, Department of Information, HMG, Nepal, 1972. Page 132.

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PART II: ENVIRONS.

CHAPTER III: WATER IN LICHCHHAVI PERIOD NEPAL.

WATER IN LICHCHHAVI PERIOD NEPAL

[Centuries ago during the periods of the Lichchhavi remarkably scientific system of operating and maintaining water systems seemed to have existed - available Inscriptions indicate today. A short summary of some of the available inscriptions is presented below.]

Recorded history in Kathmandu Valley starts about 464 AD during the Lichchhavi rule which ended about 880 AD. During those four centuries many inscriptions were left for posterity to record royal orders, norms of social and spiritual behaviour, construction of religions and secular structures, land grants for maintenance and various other usages. As many as 27 of about 160 inscriptions known so far are exclusively related to water and its usages. Lichchhavi era in Nepal had reached a very high order of urban civilisation which was developed later (12th - 18th century) by Mallas, whose marvellous urban centres can still be seen in a fairly intact shape even now. The urban environment was shaped with utmost human sensitively in meeting the social, cultural, spiritual and physical needs of the society.

Though 'Khataka' (ponds) and tanks find mention in some of the inscriptions, these do not appear to be urban elements, unlike in later Malla period when they (tanks and ponds) assume important role in urban space. Likewise bathing ghats do not seem to have been built even though some development of confluences of rivers for religious activities did take place (e.g. Shankhamul). Indeed the most important development related to water was the system of supply to urban areas. As Kirat and early Lichchhavi settlements were mostly limited in lower slopes of the outlaying mountains of the valley, supply of water was not much problem. By the time the recorded period of Lichchhavi rule starts, most urban settlements had moved to ridges and other higher lands of the valley floor. As this meant, not only moving away from the sources of water but also having the towns located at places with naturally very low subsurface water level, the problem of supplying water to urban population must have taken grave proportions. The social ingenuity and the technical knowhow led to its solution - the creation of the 'dhara', the stone water conduit. Typically this depressed rectilinear pit with a flat floor and with one or more stone water spouts coming out of the pit retaining structures defy description in words. The pits are often terraced in several incremental levels and a flight of stone stairs leads from the ground level down to the flat floor. At least six of such dharas from Lichchhavi times are intact and four are working to this day. The oldest known located at Hadigaon and built 554 AD is still working and in use.

The high cost of such dharas was matched by the technological challenge. Such being the case, building 'dharas' for public use was the most pious social activity. The level of the water source and its distance from the water spout decided the depth of the pit as it was usual to bring water by digging a channel from the source to it, usually through a covered channel. The water from the channel usually passed through a gravel/sand filter bed before reaching a reservoir structure placed behind the retaining wall holding the conduits. The reservoir was built by using long half round iles in honey comb fashion so as to limit scour. This reservoir system was clearly seen during the Ratna Park Subway Excavations. The Lichchhavis referred to this system of water spout construction using underground channel and reservoir as 'pranali'. Many of the inscriptions describe the desired and delivered water quality as "tasteful, clean and cold". The channel used for the Changunarayan stone conduit however, has been referred to as 'sarita' (or brook) and as such could well have been open.

The Lichchhavis also used a cheaper system called 'Kupanjaladrawanika' (a well and water conduit) in which for the reservoir function a well was dug. The well and conduit system has been mostly used in areas where the water table has been depressed due to the presence of impermeable layers in upper strata. The resulting artisan effect enabled them to construct shallow pit dharas. Sometimes however, the water level in the well did not rise to the expected level. In such circumstances, like in the case of Naxal Bhagbati Bahal Dhara, built 656 AD, a water drawing mechanism was used to fillup the reservoir tanks built at a higher level.

The festivities and the consequent concentration of pilgrims in different spots at different times created heavy water demands at particular times. For supply of water at such times and places a committee with land grants often existed (compare 'paniyagosthi' to 'pranaligoshthi' a committee formed for maintenance of water conduit) which arranged for carriage and distribution of water. In some places this must have been of particular importance and scale as the Lele Inscription indicates. Here the goshthi of temporary water supply is allotted land grants five times higher than goshthi dealing with water conduit. Water was also used as a feature in monumental architecture as the Tang Annals description of the Kailashkut Bhawan, amply suggest,

> at each of the four corners of the ... central seven storey ... tower there projects a water pipe of copper. At the base there are golden dragons which spout forth water. From the summit of the tower water is poured through tunnel which find its way down below streaming like a fountain from the mouth of the golden Makara.

Romantic through this description is, it nontheless could be true especially as the Hadigaon inscription of Amsuvarma lists among the officials of the palace a 'Paniyakarmantika' or a water machanic. The official's position and ranking order suggest a high importance. His job could well have been maintenance and operation of the water lifting system in the palace.

Use of water for irrigation started quite early. The 626 AD Tajhyatol inscription of Patan records repair of a 'tilamaka' (irrigation canal) built earlier and a land grant for its maintenance. a late inscription of Minnath Patan records an order for division of water from irrigation canal into seven parts and distribution among five villages. The same inscription states that crimes connected with the source (e.g. digging of earth in forest) are dealt by forest-fort authority whereas disputes connected with distribution of water and canal are dealt within the Inner Royal Court. The part allotted to each village was however managed by the village council (panchalika).

As the source of water both for drinking and irrigation was often far away and canals and channels were costly, Lichchhavis seems to have started worrying about protection of source and the watershed quite early. Inscriptions ordering strictures against digging of sources, felling of trees and farming in designated forest areas, felling of trees for firewood, burning of trees for charcoal making etc. have been found. In Balambu one inscription even records a planting of pine forest to protect the source of a water conduit 'pranali'.

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APPENDIX

APPENDIX I

TEMPLE TYPES

It has already been discussed that the main requirement of a temple form is to represent a pyramidical mountain within a lake and this set needed a circumambulatory around it for the purpose of the preparation of the devotees.These religious needs have been largely responsible for the temple form. Over the last two millenniums a variety of temple forms have envolved. Majority of these forms follow the Vastupurusamandala dictum - the remaining not conforming to the Vastupurusamandala but possibly related to some tantric yantras of later origin. The temples conforming to Vastupursamandala are classified as conformist temples - the rest being grouped as non-conformist. It is however to be noted that the non-conformist temples, do have many temple design elements common with the conformist temples. Apparantly the dictum for detailing both types of temples were same or similar.

i) Conformist Temples

By definition of the classification mode all temples under this category have square cella or sanctum room. The following types are major variants within this group.

a) Temple with square sanctum room and single doorway on the main side:

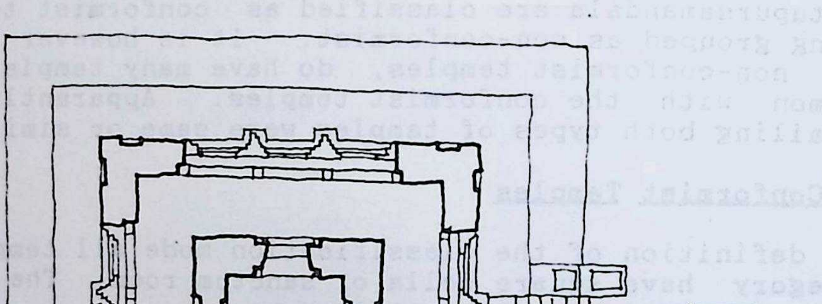
This maindoor can face any direction other than North (exception Bhatbhateni Temple). The remaining three sides may also have false relief shaped with brick recess to represent closed doors or ghanadwars. The plinths may be single or multiple in number.. The image is located centrally or near the wall opposite the line of entry.

b) Temple with square sanctum room and four doorways in cardinal points:

The image is located in the center of the room. The plinths may be single or multiple.

c) Temple with a square sanctum, walled on only one side and collonaded on three sides:

Usually used for small temples, the gods occupying such temples are those preferring open sanctums e.g. Ganesh or gods and goddesses worshipped with sacrifice of animals (Durga etc.). The diety is located at the center of the walled side in majority of such temples. Usually these temples have a single plinth.


SANCTUM
0 1 2 3 4 meters

KRISHNA MANDIR BHAKTAPUR, KHAUMA
TEMPLE TYPE i) a.

Source: BDP DRAWINGS.

SRT.

In all the above three sub-groups, the temples may have single or multiple roof. However the core wall of upper roofs do not come to sanctum level. The upper reduced size core walls end at the level of the simhamvah. The two varients listed below have resulted due to the bringing of the upper core wall to the sanctum level. This variation is followed when the structural load of upper roofs and walls are excessive and the transmission of such heavy loads to the outer structure is either not possible due to the need for very heavy timber cross beam structures at Simhamvah level or the expansive door structure of the sanctum floor left a very small portion of brick corners to take the load.

d) Temple with the square sanctum formed by the upper core wall and with a outer core wall:

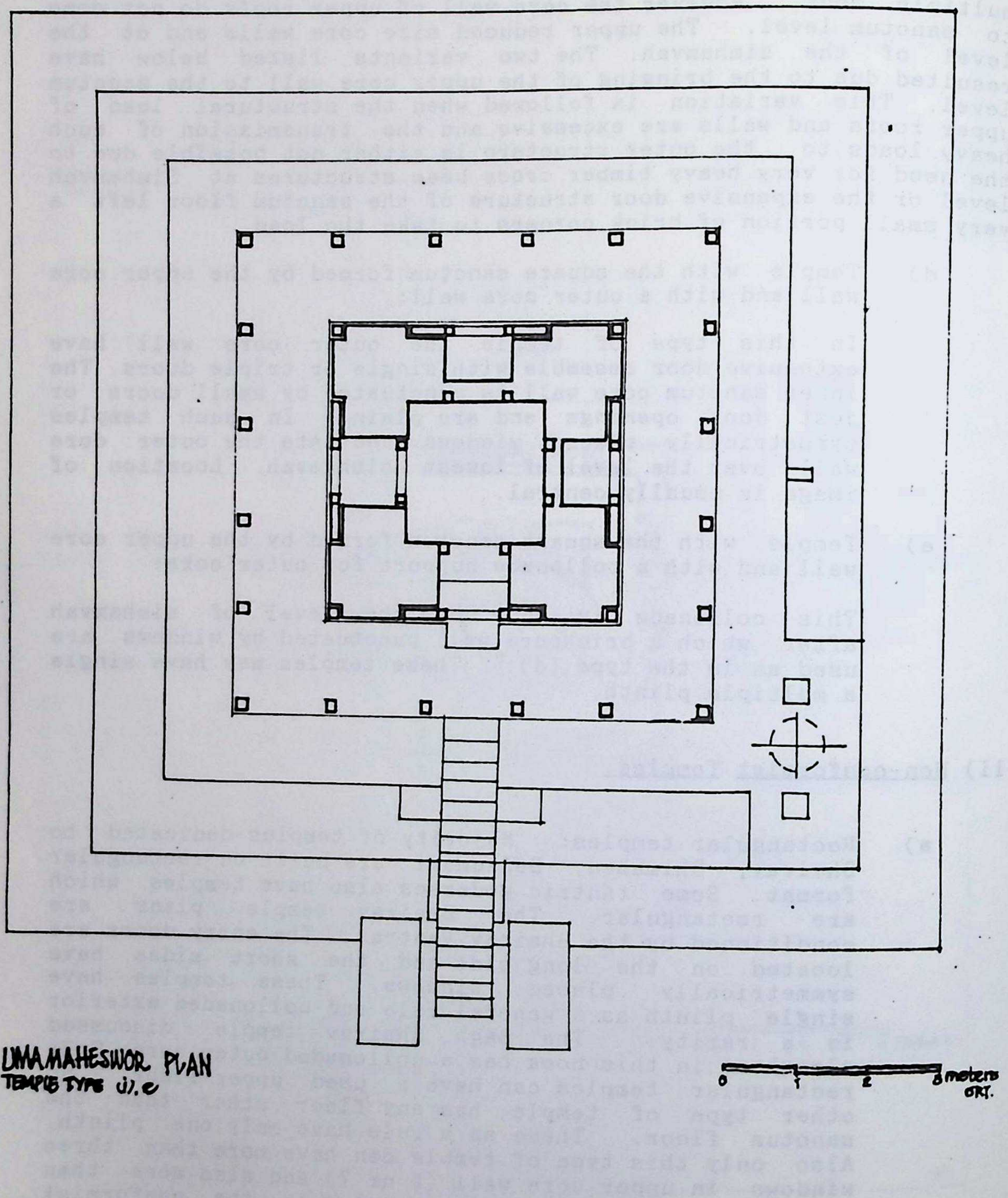
In this type of temple the outer core wall have extensive door emsemble with single or triple doors. The inner sanctum core wall is punctuated by small doors or just door openings and are plain. In such temples symmetrically placed windows punctuate the outer core wall over the level of lowest simhamvah. Location of image is usually central.

e) Temple with the square sanctum formed by the upper core wall and with a collonade support for outer core:

This collonade is only upto the level of simhamvah after which a brickcore wall punctuated by windows are used as in the type (d). These temples may have single a multiple plinth.

ii) Non-conformist Temples:

a) Rectangular temples: Majority of temples dedicated to Bhairav, Bhimshen, Balkumari are built on rectangular format. Some tantric godesses also have temples which are rectangular. The Bhairav temple plans are conditioned by the Bhairav yantra. The entry doors are located on the long side and the short sides have symmetrically placed windows. These temples have single plinth as a general rule and collonaded exterior is a rarity. The Bagh Bhairav temple discussed elsewhere in this book has a collonaded outer core. Only rectangular temples can have a used upper floor - no other type of temple has any floor other than the sanctum floor. These as a rule have only one plinth. Also only this type of temple can have more than three windows in upper core wall (5 or 7) and also more than one Gajur. Only very few temples in the conformist group have more than one Gajur (e.g. Harisiddhi Temple, Harisiddhi).Nala Bhagbati at Nala,Chandeswori at Banepa, Bhubaneswori and Jayabageswori at Deupatan are some of the goddesses with rectangular temples.

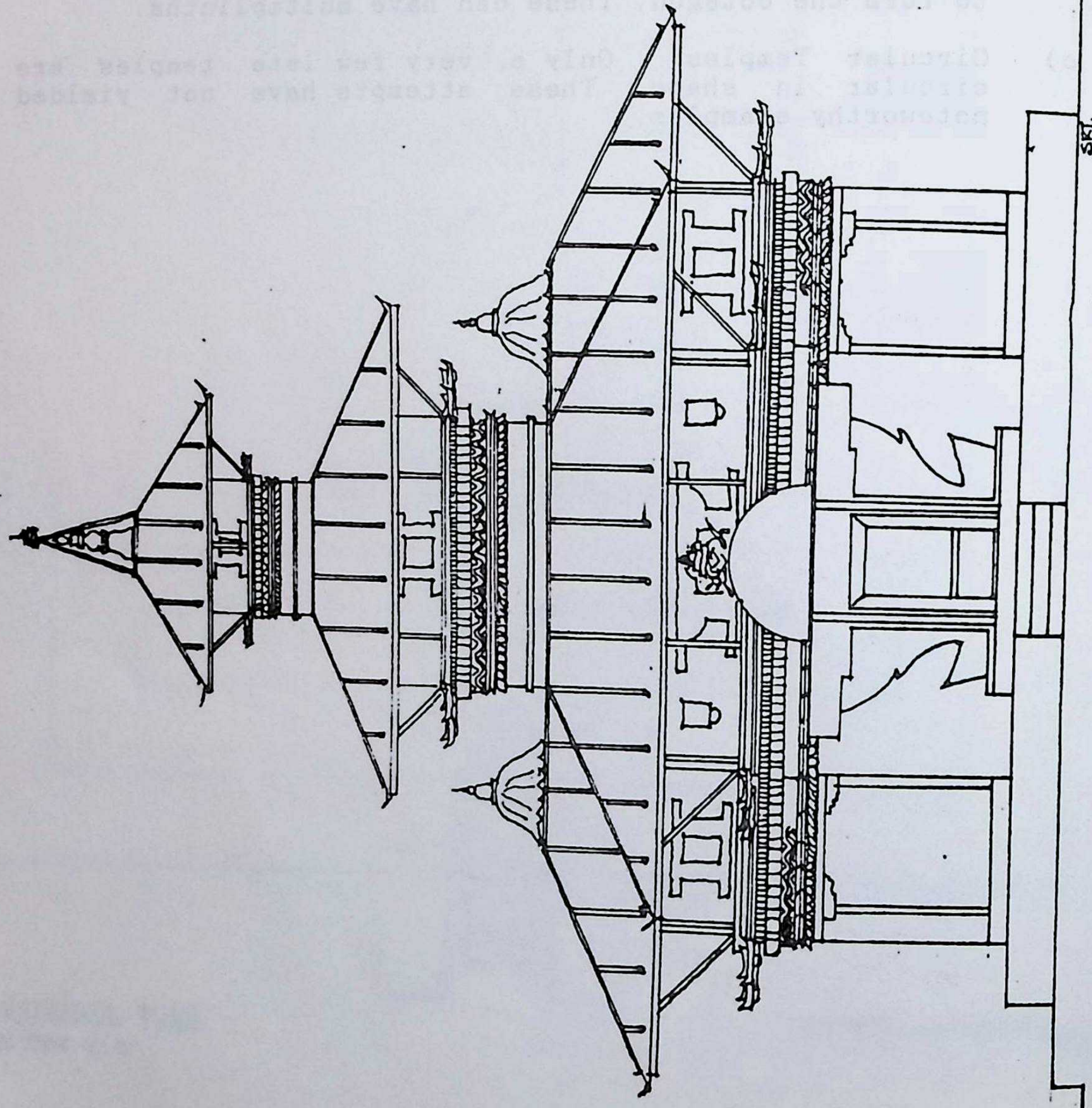

0
1
2
3 meters
ORT.

UMA MAHESWOR PLAN
TEMPLE TYPE (i).e

Jayabageswori Temple and also some others show departure from a plain rectangular form.

b) Octagonal Temples: Some temples are octagonal in plan with a collonaded circumambulatory. The plan is derived by placing two squares such that the diagonals of the first square overlap with the axes of the second. The triangles formed outside the bounding sides are removed to form the octagon. These can have multiplinths.

c) Circular Temples: Only a very few late temples are circular in shape. These attempts have not yielded noteworthy examples.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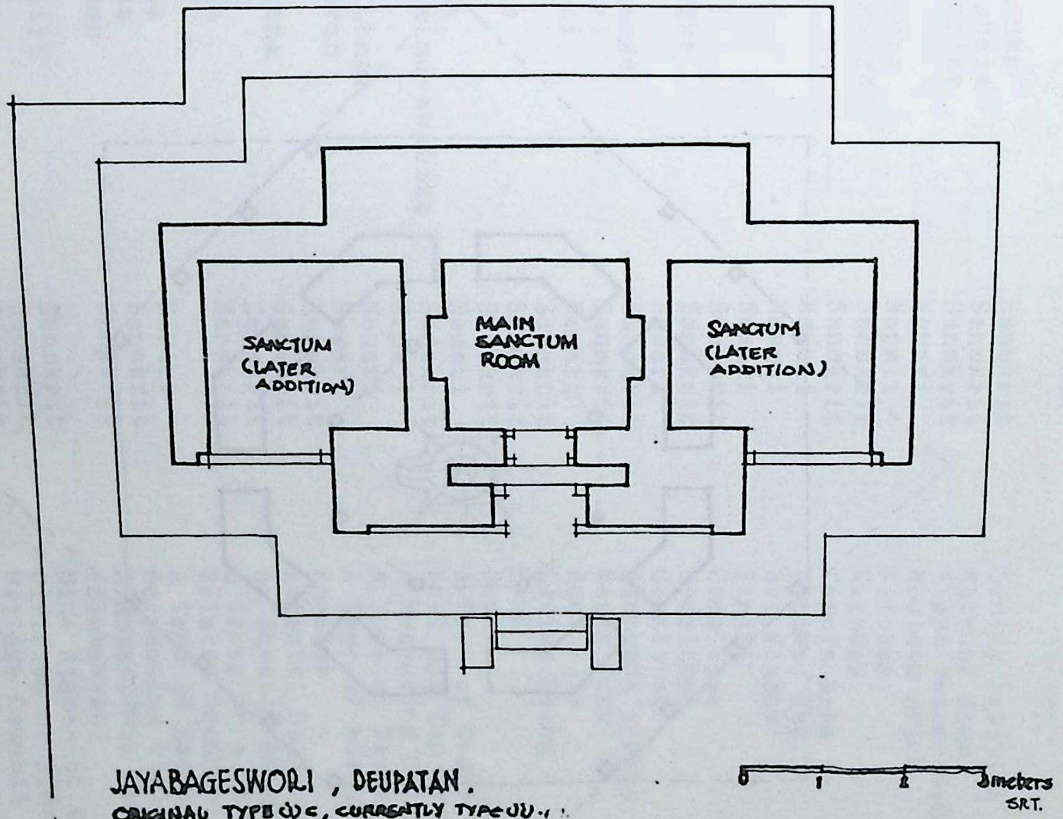
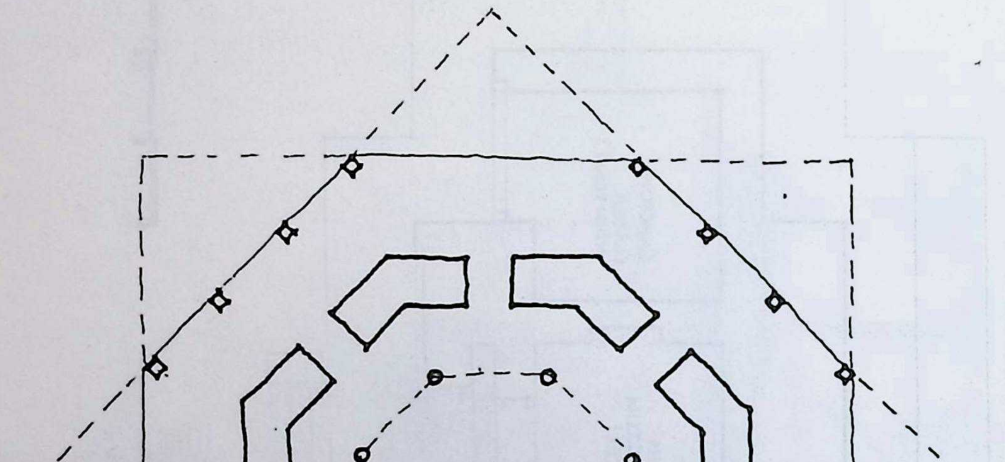

SANCTUM (LATER ADDITION)
MAIN SANCTUM ROOM
SANCTUM (LATER ADDITION)
0
1
2
3 meters
SRT.

JAYABAGESWORI , DEUPATAN.
ORIGINAL TYPE (I)c, CURRENTLY TYPE (II)-1.



OCTAGONAL SIVA TEMPLE (classical texts)
TYPE ii.(b)

SRT

APPENDIX - II

Index of Local Terminologies

Word	Origin	Meaning
Aharmandap	Sanskrit	Dining Pavilion
Arogyashala	Sanskrit	Nursing Home
Astamatrika	Sanskrit	Eight Mother Goddess
Baapa	Newari	Moulded Brick
Bhansaghar	Nepali	Kitchen
Brihatmarga	Sanskrit	Highway
Debkul	Sanskrit	Temple Area
Dhara	Nepali	(Stone) Tap
Ga-jhya	Newari	Bay Window
Gajur	Newari	Finial
Goshthi	Sanskrit	Committee
Goshthika	Sanskrit	Committee
Guthi	Newari	Committee
Hastimarga	Sanskrit	Elephant's Path
Jalahari	Sanskrit	Water Tray
Jhingati	Newari	Roof Tile
Jiva	Sanskrit	Living Being
Khataka	Sanskrit	Pond
Khadga	Sanskrit	Sword
Khalapa	Newari	A Type of Baapa
Kupanjaladrawanika	Sanskrit	Well and Tap System
Kuret	Nepali	A Measuring Unit
Lakha Lhapa	Newari	A Type of Baapa
Lhahphvah	Newari	A Type of Baapa
Linga	Sanskrit	Phallus
Mahapatha	Sanskrit	Arterial Road
Makara	Sanskrit	An Aquatic Animal
Mandala	Sanskrit	A Group or a Diagram of a Related Group of Elements
Mvahapa	Newari	A Type of Baapa
Nagpasa	Sanskrit	Serpentine Strip
Narapasu	Sanskrit	A Animal-Man Hybrid (Simhamvah)
Navaratri	Sanskrit	Nine Nights of Dasain
Pada	Sanskrit	Division or Side
Panchalika	Sanskrit	Village Council
Paniyagosthi	Sanskrit	Water Management Committee
Paniyakarmantika	Sanskrit	Water Mechanic
Paniyasala	Sanskrit	Place for Drinking Water
Paryantasutra	Sanskrit	Limiting Grid
Pith	Sanskrit	Sacred Spot
Pola	Newari	Number of Roof
Pranali	Sanskrit	Stone Conduit System

Word	Origin	Meaning
Pramanasutra	Sanskrit	Cardinal Axes
Prasada	Sanskrit	Temple Body
Rajakul	Sanskrit	Palace Area
Savagriha	Sanskrit	Meeting Hall
Shruti	Sanskrit	Learned by Hearing
Shakti	Sanskrit	Goddess or Power
Simhamvah	Newari	A Type of Baapa
Snangriha	Sanskrit	Bathing Room
Torana	Sanskrit	Tympanum
Tilamaka	Sanskrit	Irrigation Canal
Tunal	Sanskrit	Strut
Vastupurushamandala	Sanskrit	Architectural Diagram
Vinayasutra	Sanskrit	Grid Line
Vyala	Newari	An Aquatic Animal

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Sudarshan Raj Tiwari earned his Bachelor of Architecture from University of Delhi with a gold medal in 1973. He got his Masters in Architecture from University of Hawaii in 1977. He has lectured and attended seminars and workshops on architectural heritage and conservation extensively.

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